

1

WRIGHT LABORATORY

AD-A258 746



RESEARCH AND DEVELOPMENT FACILITIES HANDBOOK

AUGUST 1992



DTIC
ELECTE
DEC 04 1992
S B D

92-30680




APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

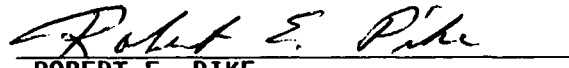
NOTICE


When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely Government-related procurement, the United States Government incurs no responsibility or any obligation whatsoever. The fact that the government may have formulated or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication, or otherwise in any manner construed, as licensing the holder, or any other person or corporation; or as conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

This report is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.


MARGARET B. SKUJINS
Test Engineer
WL/DOT


ROBERT E. PIKE
Chief, Test & Evaluation Division
WL/DOT


DENNIS F. MARKISELLO, Colonel, USAF
Director
Operations & Support

If your address has changed, if you wish to be removed from our mailing list, or if the addressee is no longer employed by your organization please notify **WL/DOT, WPAFB, OH 45433-6523** to help us maintain a current mailing list.

Copies of this report should not be returned unless return is required by security considerations, contractual obligations, or notice on a specific document.

AIR FORCE, 86145/09-10-92-355

Accession For	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

REPORT DOCUMENTATION PAGEForm Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE August 1992	3. REPORT TYPE AND DATES COVERED Handbook	
4. TITLE AND SUBTITLE Wright Laboratory Research and Development Facilities Handbook			5. FUNDING NUMBERS PE 62203F PR 6106PX	
6. AUTHOR(S) Margaret B. Skujins, 513-255-4404				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Test & Evaluation Division (WL/DOT) Wright Laboratory Wright Patterson AFB OH 45433-6523			8. PERFORMING ORGANIZATION REPORT NUMBER WL-TR-92-0004	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Wright Laboratory Wright Patterson AFB OH 45433-6523			10. SPONSORING / MONITORING AGENCY REPORT NUMBER WL-TR-92-0004	
11. SUPPLEMENTARY NOTES WL-TR-92-0004 Supersedes WRDC-TR-90-0001				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This handbook contains a listing of Wright Laboratory research and development facilities located at Wright Patterson AFB OH and Eglin AFB FL. Facilities included are those of the Aero Propulsion and Power, Armament, Avionics, Flight Dynamics, Materials, Plans and Programs, and Solid State Electronic Directorates. Documented listings include information on facility type, capabilities, instrumentation, availability, and point of contact.				
14. SUBJECT TERMS Avionics Materials Aero Propulsion and Power			15. NUMBER OF PAGES 403	
Flight Dynamics Signature Technology			16. PRICE CODE	
Solid State Elect. Armament				
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

TABLE OF CONTENTS

Introduction.....	v
Functional Overviews.....	vii
Aero Propulsion and Power Directorate.....	1
Armament Directorate.....	109
Avionics Directorate.....	167
Flight Dynamics Directorate.....	235
Materials Directorate.....	327
Plans and Programs Directorate.....	375
Solid State Electronics Directorate.....	387
Index-Facility Name.....	397
Index-Key Word.....	401

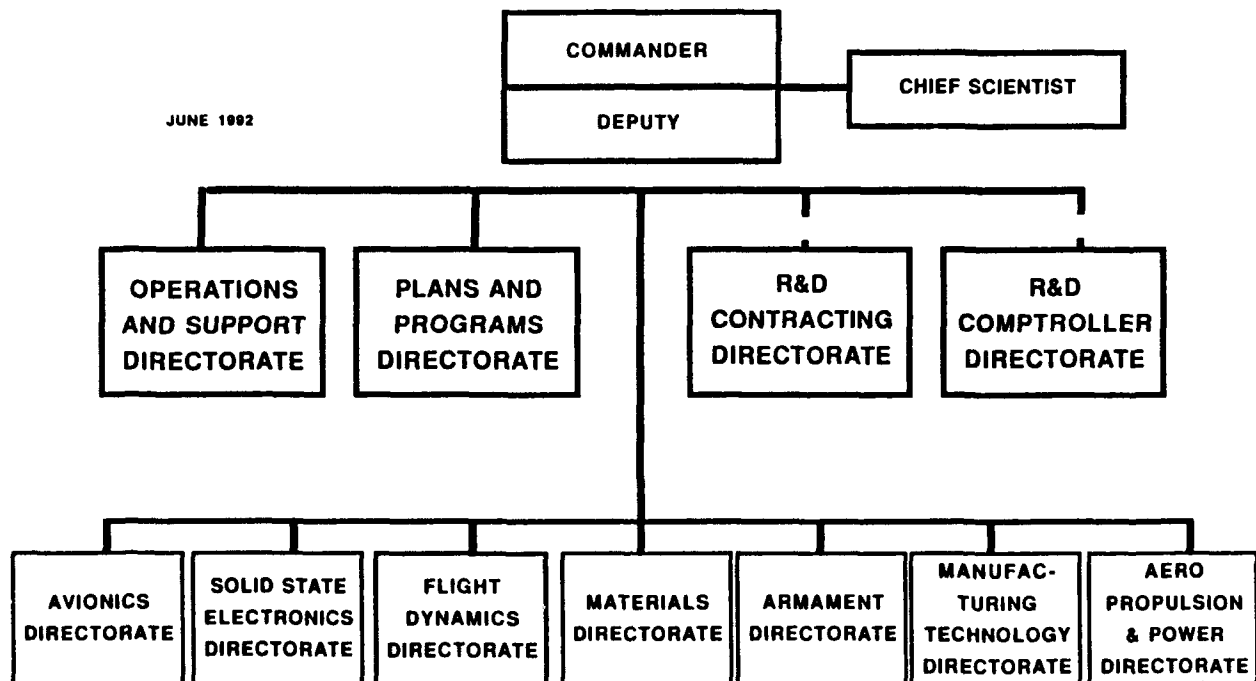
INTRODUCTION

The Wright Laboratory (WL) Research Facilities Handbook is organized as a quick look reference to facility capabilities available in the Laboratory.

WL is organized into seven technology directorates and four support directorates which operate in concert to deliver the world's best aeronautical technologies to the world's best Air Force. We work as an integrated, multidisciplinary team to meet the needs of our customers.

The WL Research Facilities Handbook consists of a brief functional overview of the directorates which have research facilities, a summary of each facility, a facility name index, and a keyword index.

WRIGHT LABORATORY WRIGHT PATTERSON AFB, OH 45433-6523



FUNCTIONAL OVERVIEWS-DIRECTORATES

AERO PROPULSION AND POWER - The Aero Propulsion and Power Directorate focuses on airbreathing propulsion and aerospace power technology, which includes fuels and lubricants, turbine engines, and high performance/high Mach air-breathing propulsion applications. Aerospace power research up to megawatt-class systems centers around electro-chemical energy storage, hyperconducting generators, and power conditioning subsystems.

DIVISIONS:	Aerospace Power	(POO)
	Advanced Propulsion	(POP)
	Fuels and Lubrication	(POS)
	Turbine Engine	(POT)

ARMAMENT DIRECTORATE - The Armament Directorate develops conventional armament technologies and integrates those into air-vehicle and other delivery platforms. The directorate provides conventional armament technology for four major thrusts which include advanced guidance, weapon flight mechanics, ordnance, and strategic flight.

DIVISIONS:	Weapon Flight Mechanics	(MNA)
	Advanced Guidance	(MNG)
	Munitions	(MNM)
	Operations	(MNO)
	Analysis and Strategic Defense	(MNS)

AVIONICS DIRECTORATE - The Avionics Directorate conducts research and development activities in the fields of offensive sensors (e.g. radar, infrared search and track, forward looking infrared), weapon delivery systems, reconnaissance, electronic warfare, navigation, communications, and avionics integration. Engineers emphasize not only performance enhancement, but avionics reliability and affordability as well.

DIVISIONS:	Systems Avionics	(AAA)
	Mission Avionics	(AAR)
	Electronic Warfare	(AAW)

FLIGHT DYNAMICS DIRECTORATE - The Flight Dynamics Directorate conducts the full spectrum of flight vehicle research. Primary areas of interest include aircraft structures, vehicle subsystems (landing gear, transparencies, etc.) flight control and aeromechanics. In addition, this directorate develops and maintains a fleet of experimental test vehicles to demonstrate integrated technologies -- avionics, flight control, propulsion -- in an airborne environment.

DIVISIONS:	Structures	(FIB)
	Flight Control	(FIG)
	Aeromechanics	(FIM)
	Cockpit Integration	(FIP)
	Vehicle Subsystems	(FIV)

MATERIALS DIRECTORATE - The Materials Directorate explores new materials and processes for advanced aerospace applications. Its current focus is on thermal protection materials, metallic and nonmetallic structural materials, aerospace propulsion materials, electromagnetic and electronic materials and laser-hardened materials.

DIVISIONS:	Nonmetallic Materials	(MLB)
	Metals and Ceramics	(MLL)
	Electromagnetic Materials and Survivability	(MLP)
	System Support	(MLS)

PLANS AND PROGRAMS DIRECTORATE - The Plans and Programs Directorate manages system and subsystem level technology integration across all WL disciplines and includes technologies from other organizations. Manages key high emphasis multidisciplinary technology development. Responsible for the WL investment strategy process and technology transfer/transition.

DIVISION:	Signature Technology	(XPN)
-----------	----------------------	-------

SOLID STATE ELECTRONICS DIRECTORATE - The Solid State Electronics Directorate is responsible for electronic device research and development in the areas of microelectronics, microwaves and electro-optics. Research extends from fundamental semiconductor layer growth and device fabrication through integrated circuits. In the electro-optics area, lasers, detectors and integrated focal plane arrays are developed.

DIVISIONS:	Microelectronics	(ELE)
	Microwave	(ELM)
	Electro-Optics	(ELO)
	Research	(ELR)



FACILITY TYPE:

Airbreathing Propulsion System

PURPOSE:

Provides simulated flight conditions for research cells in the turbine engine, advanced propulsion and fuel technology areas

FACILITY NAME:

Component Research Air Facility

PRIMARY CAPABILITIES:

Compressed air available

32 lbs/sec (pps) at 750 psia, from ambient to 1200 deg F; 31 pps at 50 psia, ambient temperature; 7.5 pps at 315 psia, ambient temperature to 1200 def F

Altitude simulation from sea level to 60,000 ft at various flow rates

SPECIAL/UNIQUE CAPABILITIES:

Clean, heated air with altitude simulation for small to moderate scale component research

INSTRUMENTATION:

Monitor pressure, temperature, flow and vibration

Central control room

Facility located in buildings 18B, 18E, 18F

AVAILABILITY:

Not a stand alone facility

Used in conjunction with PO test cells

LOCATION:

BUILDING: 18B ROOM: Bsmt

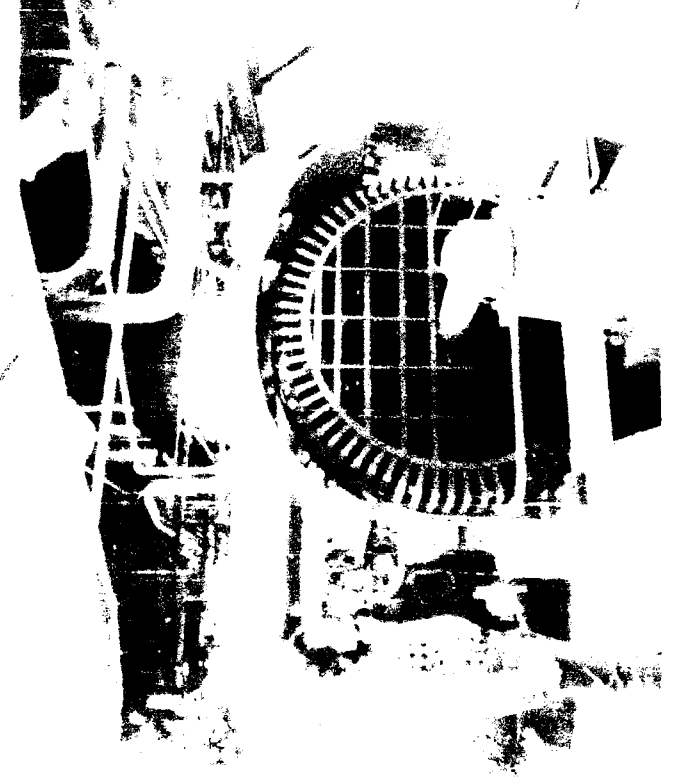
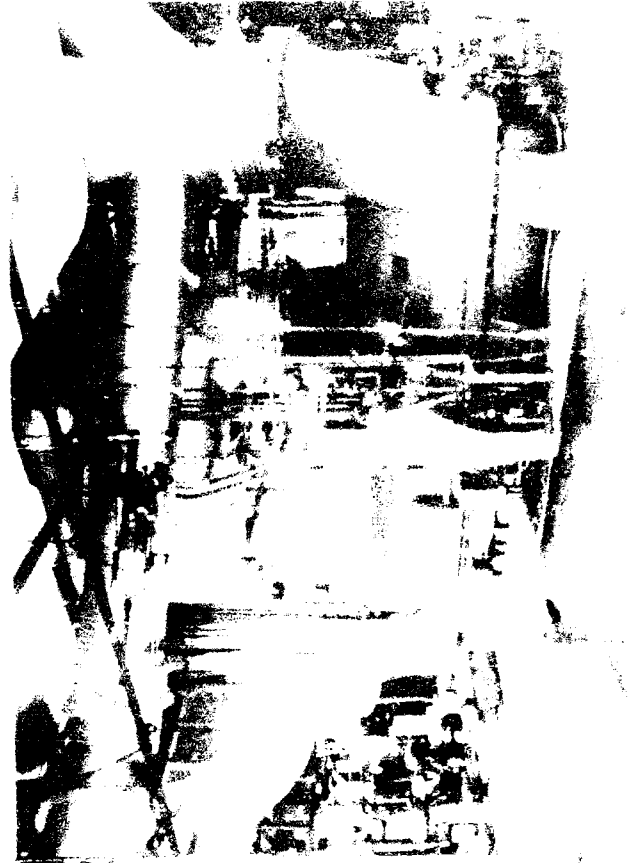
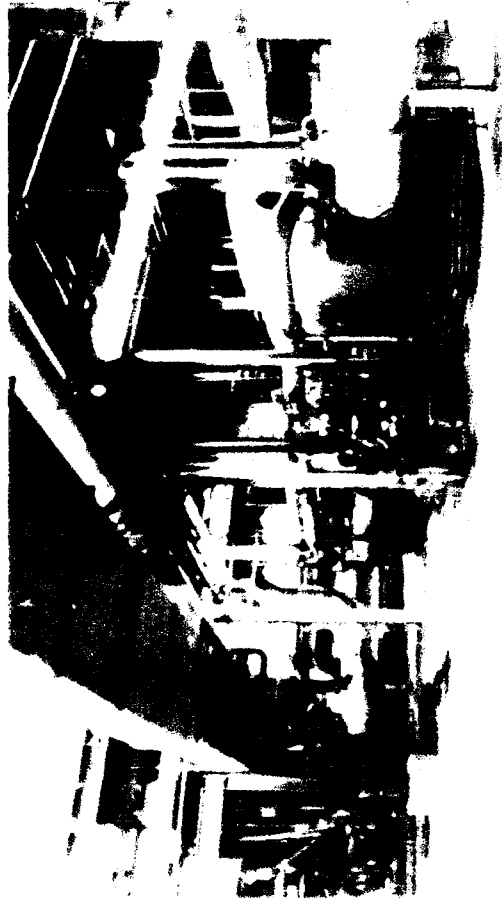
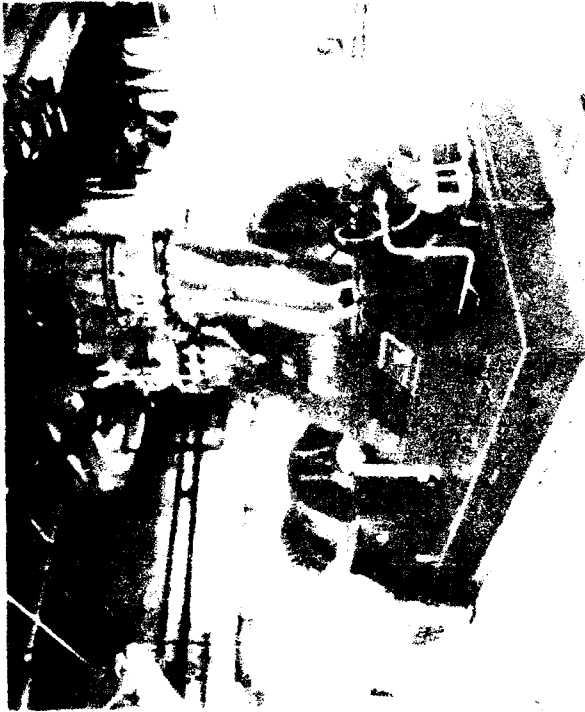
POINT OF CONTACT:

WL/POME

WPAFB, OH 45433-6563

(513) 255-4013

DSN 785-4013



Component Air Research Facility

FACILITY TYPE:

Helicopter Rotor Test

PURPOSE:

Performance, endurance and validation testing of
helicopter rotors

FACILITY NAME:

Helicopter Rotor Test Facility

PRIMARY CAPABILITIES:

Electrically driven whirl test stand

Horsepower-4,000; lift-50,000 lbs; maximum rotor
diameter(ft)-94; RPM-625

SPECIAL/UNIQUE CAPABILITIES:

Only large government owned rotor test facility on
stand-by status

Precise speed control possible

INSTRUMENTATION:

Monitor rotational speed, power, lift and several other
equipment related parameters

AVAILABILITY:

On stand-by for support of US Government agency
sponsored tests

LOCATION:

BUILDING: 250 ROOM:

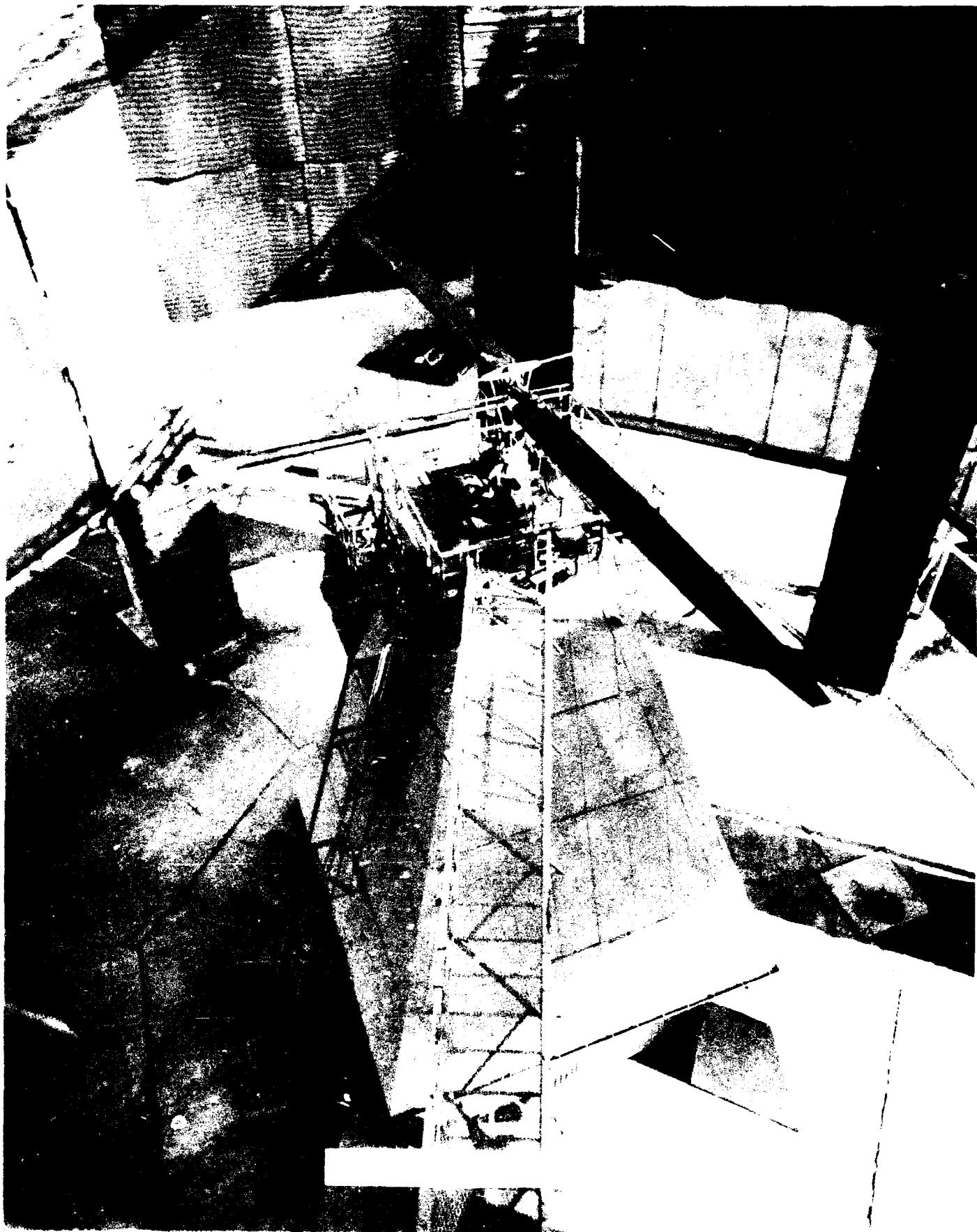
POINT OF CONTACT:

WL/POME

WPAFB, OH 45433-6563

(513) 255-4013

DSN 785-4013



FACILITY TYPE:

Propeller Test

PURPOSE:

Performance, endurance, and validation testing of
propellers and other test articles

FACILITY NAME:

Propeller Test Facility

PRIMARY CAPABILITIES:

Whirl Rig #1:hp-10,000; thrust(lb)-60,000; max test
article diameter(ft)-44; RPM-7,200

Whirl Rig #2:hp-3,500; thrust(lbs)-40,000; max test
article diameter(ft)-44; RPM-9,000

Whirl Rig #3:hp-2,500; thrust(lbs)-20,000; max test
article diameter(ft)-44

SPECIAL/UNIQUE CAPABILITIES:

Electrically driven

High horsepower drives

Wide speed range with precise speed control

INSTRUMENTATION:

Monitor rotational speed, power, thrust,vibration and
bearing temperatures

AVAILABILITY:

Available to U.S. government agencies

Available to US Government agency sponsored contractors

LOCATION:

BUILDING: 20A ROOM:

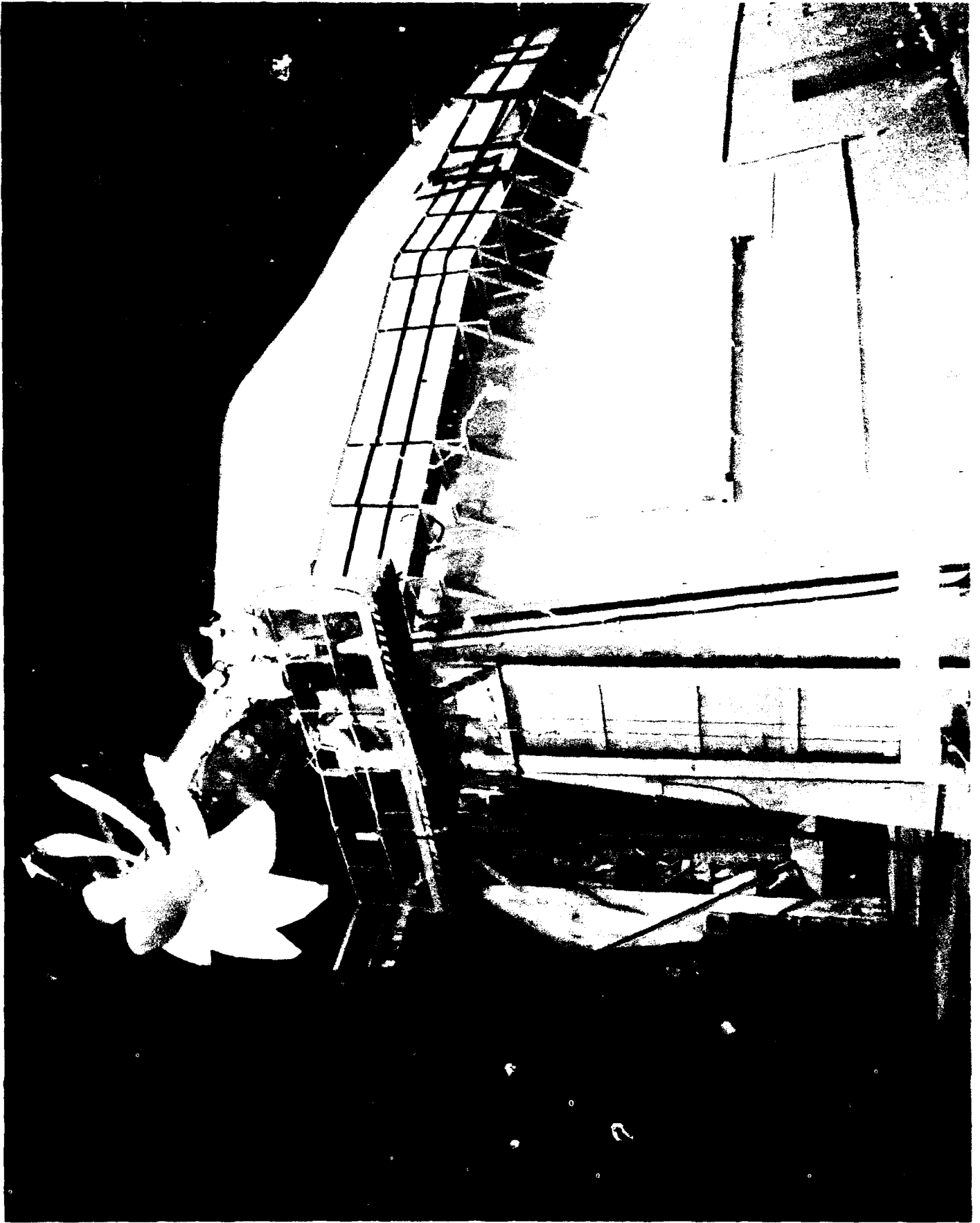
POINT OF CONTACT:

WL/POME

WPAFB, OH 45433-6563

(513) 255-4013

DSN 785-4013



FACILITY TYPE:

Aircraft Electrical Power Systems

PURPOSE:

Evaluate state-of-the-art power generation, conversion, and motor drive equipment for aircraft applications

FACILITY NAME:

Aircraft Electrical Power Laboratory

PRIMARY CAPABILITIES:

Test electrical components and systems from high speed power devices to several hundred kilowatt aircraft power systems

SPECIAL/UNIQUE CAPABILITIES:

Three computer controlled 350 hp drive stands

INSTRUMENTATION:

CAMAC based data acquisition on MicroVAX II GPX

Data acquisition and analysis capability

On wave forms up to 100MHZ

AVAILABILITY:

Available to U.S. Government agencies

LOCATION:

BUILDING: 18B ROOM: 13,15

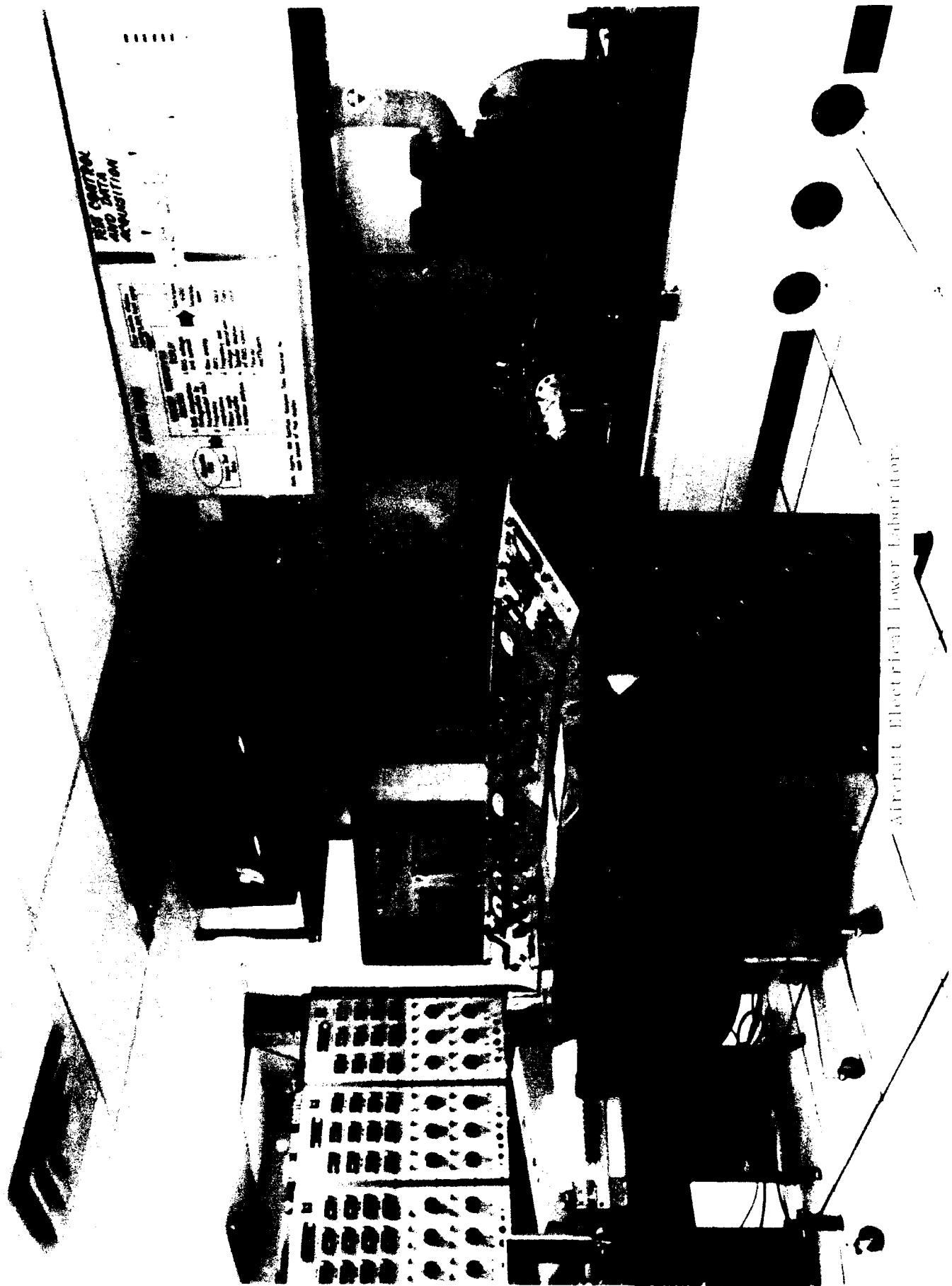
POINT OF CONTACT:

WL/POOC

WPAFB, OH 45433-6563

(513) 255-6235

DSN 785-6235



Aircraft Electrical Power Laboratory

FACILITY TYPE:
Optics

PURPOSE:
Conduct research to develop advanced optical techniques
to explore combustion and plasma environments

FACILITY NAME:
Optical Diagnostics Laboratory

PRIMARY CAPABILITIES:
Laser spectroscopy

Two-dimensional optical imaging

SPECIAL/UNIQUE CAPABILITIES:
CW argon-ion laser for pumping a dye laser

Nd:YAG-pumped dye laser; nitrogen laser-pumped dye laser

High speed 2-D imaging and image analysis system

INSTRUMENTATION:
Tunable UV to near IR pulsed laser source

High speed digitizer and photon detection systems

AVAILABILITY:
Primarily in-house research

Limited use by US Government contractors

LOCATION:
BUILDING: 450 ROOM: D101

POINT OF CONTACT:
WL/POOC
WPAFB, OH 45433-6563
(513) 255-2923
DSN 785-2923



FACILITY TYPE:

Plasma Physics

PURPOSE:

Experimental and theoretical research on low energy plasmas

FACILITY NAME:

Plasma Physics Laboratory

PRIMARY CAPABILITIES:

Plasma investigations for lasers, high power switches and thin film processing

SPECIAL/UNIQUE CAPABILITIES:

200 KV electron gun with closed discharge system

Fourier transform infrared spectrometer; Fourier transform mass spectrometer

RF plasma reactor

INSTRUMENTATION:

Many of above devices controlled by microcomputers

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 450 ROOM: D101

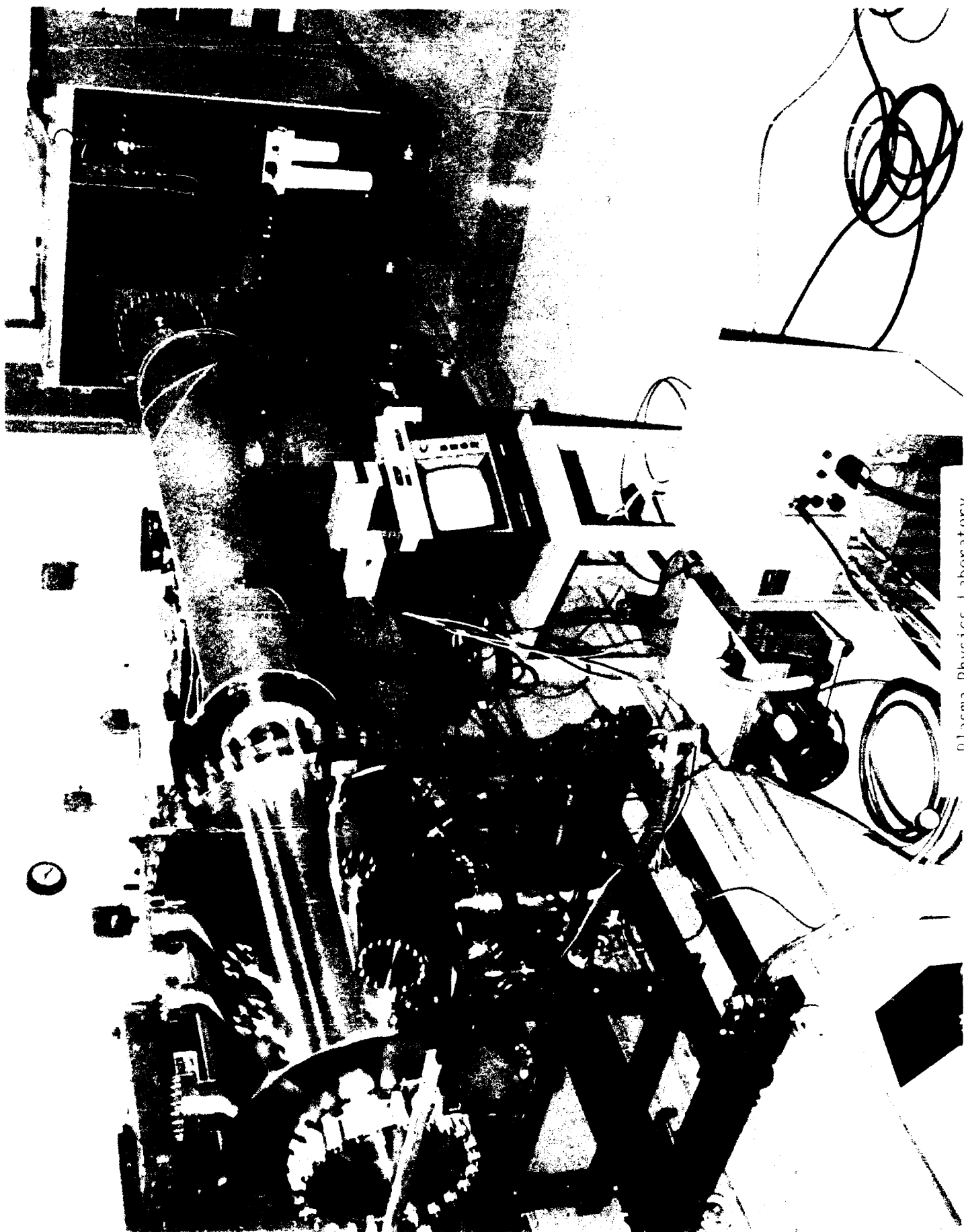
POINT OF CONTACT:

WL/POOC

WPAFB, OH 45433-6563

(513) 255-2923

DSN 785-2923



Plasma Physics Laboratory

FACILITY TYPE:

Power Semiconductor Devices and Materials Evaluation

PURPOSE:**FACILITY NAME:**

Power Semiconductor Laboratory

PRIMARY CAPABILITIES:

Electrical characterization & thermal performance measurement (power semiconductors, transistors, power integrated circuits, application specific ICs, power devices)

Contact evaluation

Circuit assembly and test

Photolithography and metal deposition

SPECIAL/UNIQUE CAPABILITIES:

Vacuum chambers for thermal cycling and ultraviolet radiation testing

Calorimetry capability to 730 deg C

Fully equipped class 100 clean room for high temperature metallization research

INSTRUMENTATION:

Evaporation and sputtering deposition systems

Ultrasonic cleaner; welder and pull tester

Spectral radiometer; mini VAX; differential scanning calorimeter

AVAILABILITY:

In-house research

Limited availability to US Government agencies and their contractors

LOCATION:

BUILDING: 18 ROOM: 35G

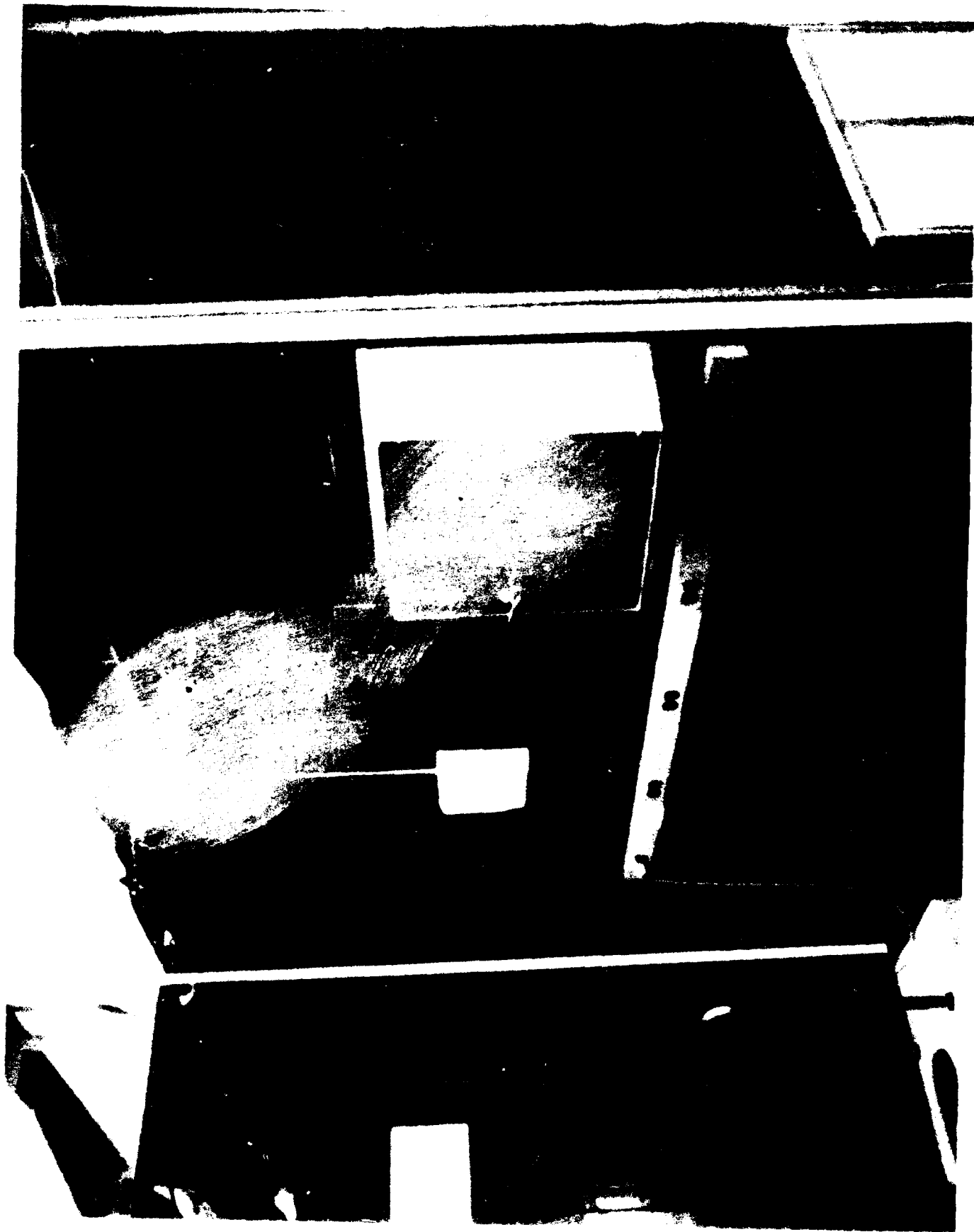
POINT OF CONTACT:

WL/POOC

WPAFB, OH 45433-6563

(513) 255-6235

DSN 785-6235



Power Semiconductor Laboratory

FACILITY TYPE:

Thermionic Energy Conversion

PURPOSE:

Conduct research on thermionic energy conversion devices for electrical power generation

FACILITY NAME:

Thermionics Laboratory

PRIMARY CAPABILITIES:

Basic and applied research on high temperature thermionic emission through diodes using refractory materials for electrodes

Diagnostic life testing capabilities for future diodes

SPECIAL/UNIQUE CAPABILITIES:

Liquid metal processing for thermionic diodes

Fully equipped diode test stations with alternating current sweep biasing

INSTRUMENTATION:

High speed data acquisition

High efficiency electron bombardment heating; accurate high temperature measurement

IBM-PC/AT compatible data processing

AVAILABILITY:

In-house research

Limited use by government agencies and government contractors

LOCATION:

BUILDING: 18 ROOM: 16

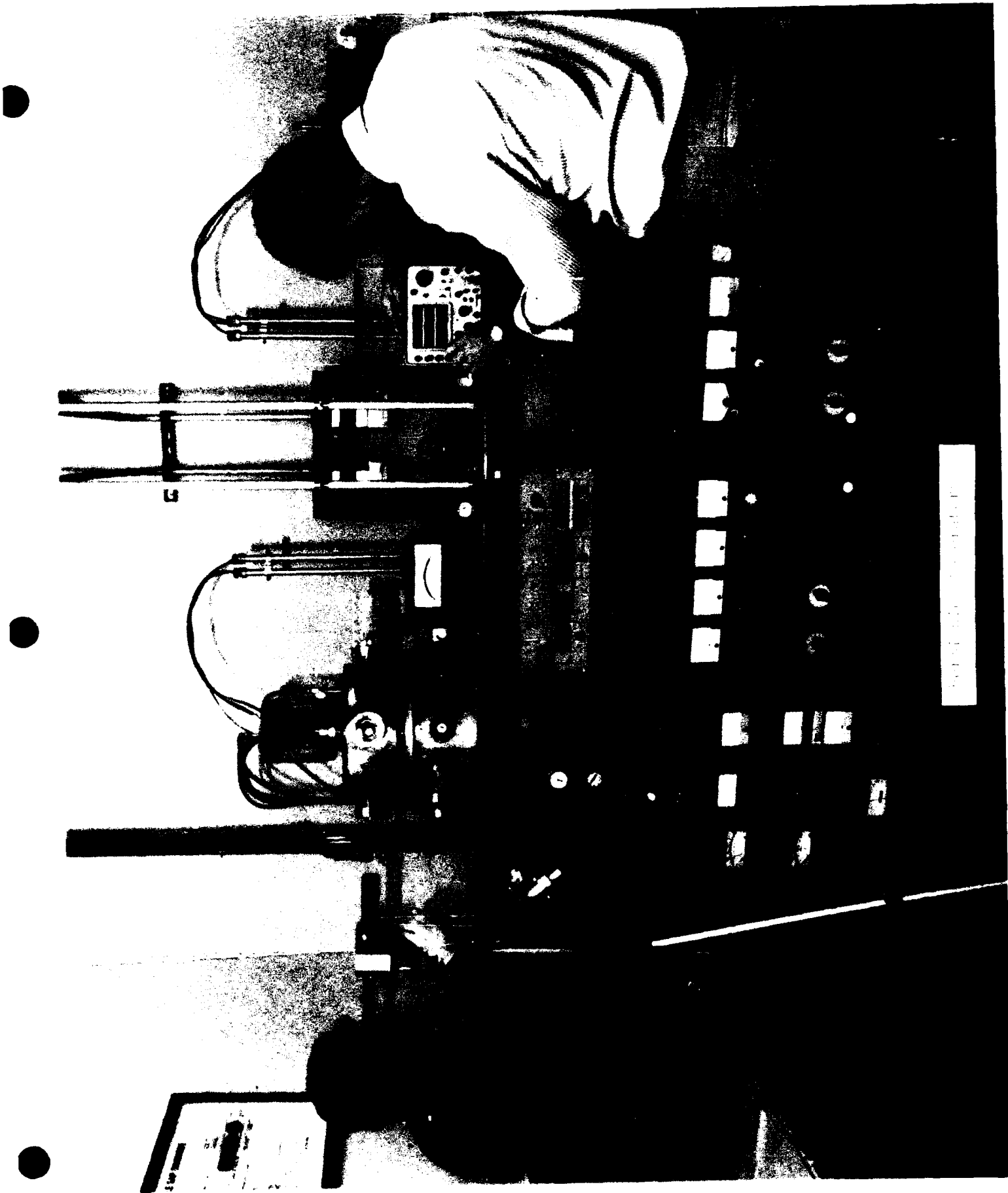
POINT OF CONTACT:

WL/POOC

WPAFB, OH 45433-6563

(513) 255-6235

DSN 785-6235



FACILITY TYPE:

Heat Transfer R&D Facility

PURPOSE:

Conduct basic and applied heat transfer research applicable to aircraft and spacecraft power thermal management

FACILITY NAME:

Ammonia Research Facility

PRIMARY CAPABILITIES:

Transient and steady-state component testing

Developmental work on capillary pump loop systems

Performance testing of high capacity heat pipes as well as conventional and flat plate heat pipes

Testing and analysis of high "g" effects on heat transfer processes

SPECIAL/UNIQUE CAPABILITIES:

Heat pipe fabrication area, heat transfer fluid processing and fill station (low temperature)

Ammonia testing capability with ammonia fill station, high vacuum systems and explosion-proof test cells

Centrifugal table for low and high "g" testing, body force modelling

INSTRUMENTATION:

Vacuum leak detection system, automated data acquisition and high vacuum pumps

Calorimetry and temperature measurements

Environmental and inert gas atmosphere chamber, 100 kW refrigeration system

AVAILABILITY:

Primarily in-house research

Limited to US Government agency use

LOCATION:

BUILDING: 71B ROOM: H-Bay

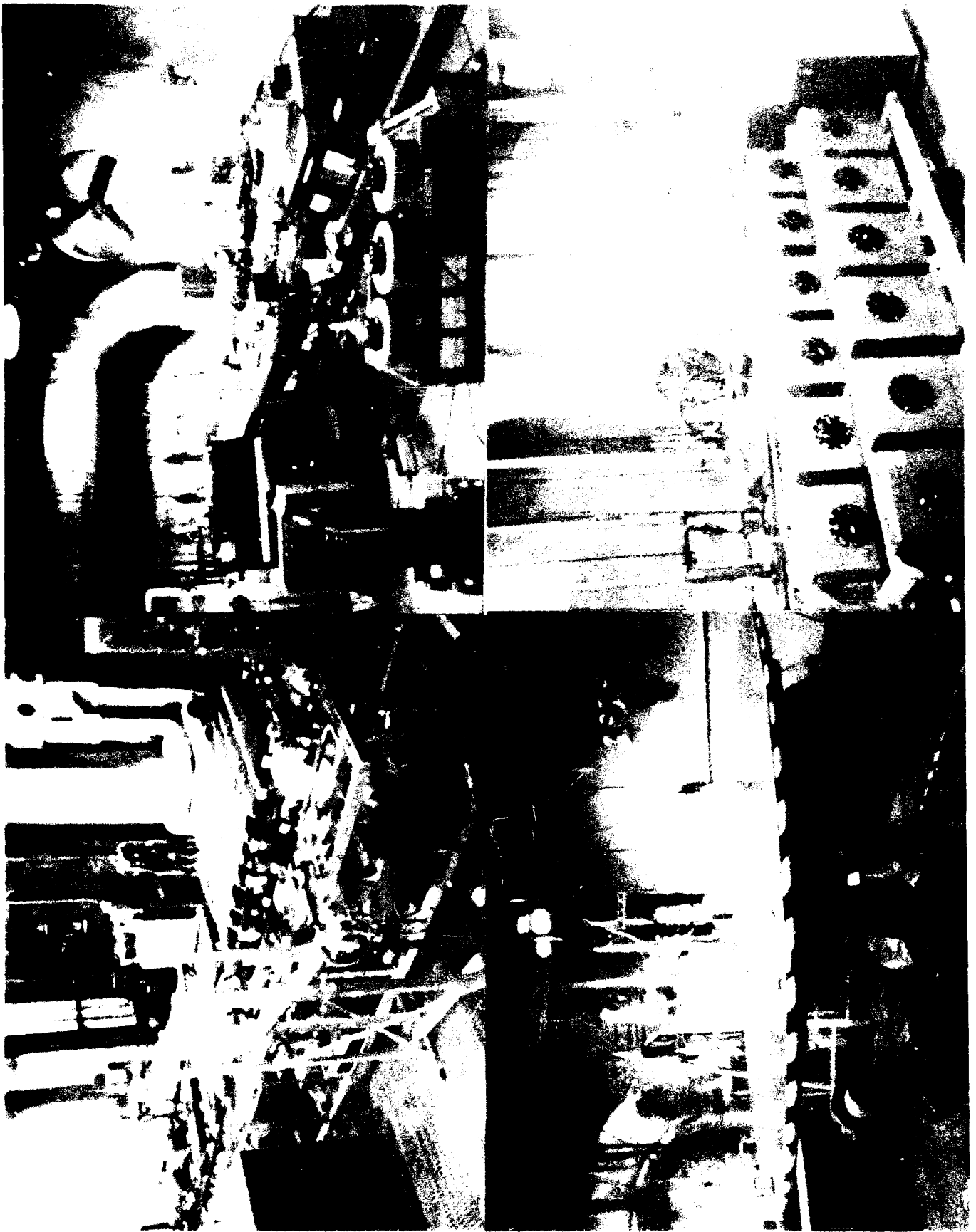
POINT OF CONTACT:

WL/POOS

WPAFB, OH 45433-6563

(513) 476-4428

DSN 786-4428



Ammonia Research Facility

FACILITY TYPE:

Battery R&D Laboratory

PURPOSE:

Research and development in electrochemical energy conversion

FACILITY NAME:

Battery Laboratory

PRIMARY CAPABILITIES:

Fabricate, evaluate and life test batteries/cells and fuel cells

Electrochemical analysis equipment and test facilities for continuous (24 hr/day) testing

SPECIAL/UNIQUE CAPABILITIES:

Chemical laboratory

Dry room with 2% or less relative humidity

Explosion-proof test isolation chambers

INSTRUMENTATION:

Gas chromatograph; differential scanning calorimeters; Fourier transform infrared spectrophotometer

Inert atmosphere chamber; microcalorimeter; thermogravimetric analyzer; battery automatic test equipment; redundant HP 1000 computer control/ data collection

Scanning electron microscope; time-lapse optical microscope; energy dispersive X-ray spectrometer

AVAILABILITY:

Primarily in-house research

Limited U.S. Government agency use

LOCATION:

BUILDING: 12B ROOM: 29-33

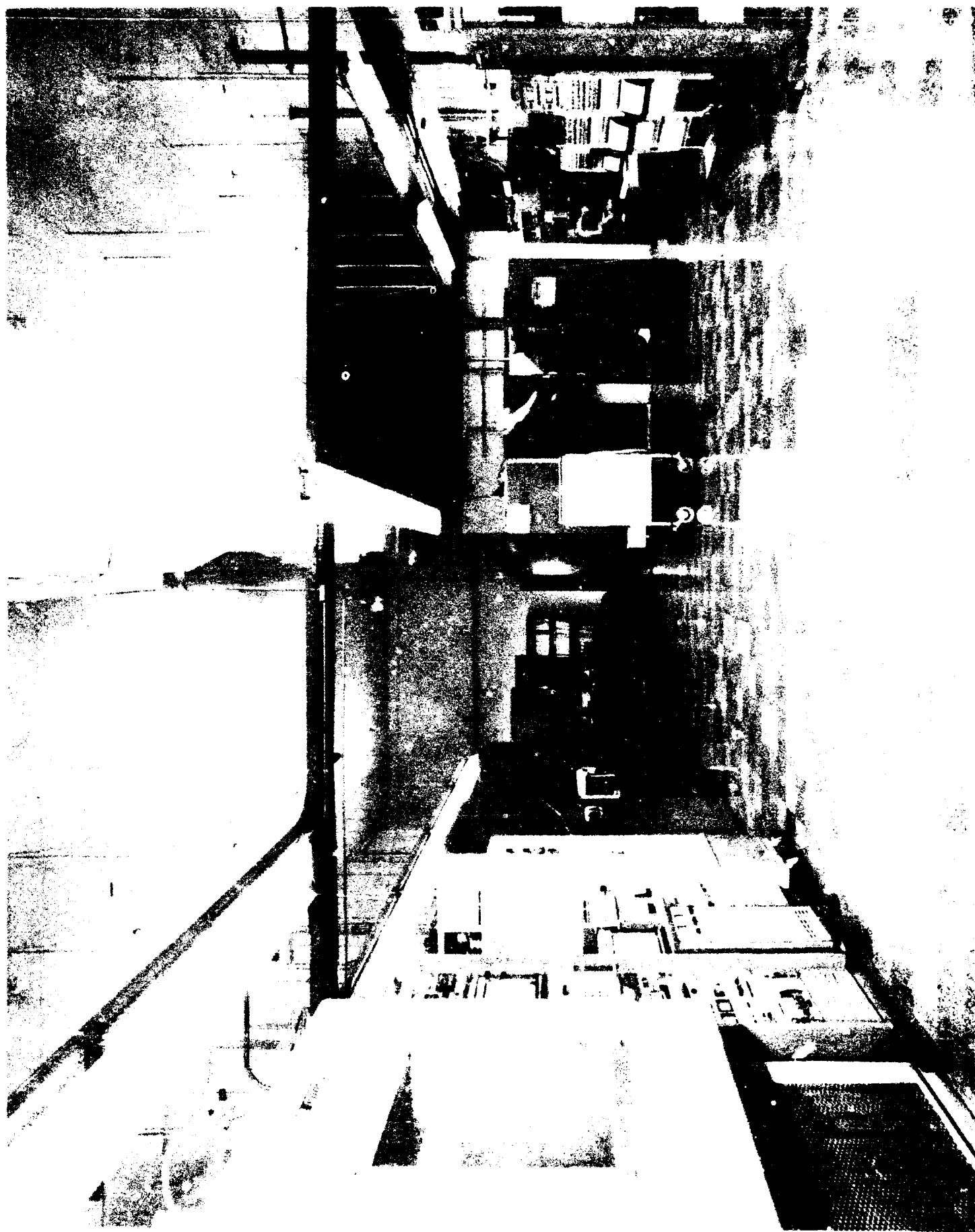
POINT OF CONTACT:

WL/POCS

WPAFB, OH 45433-6563

(513) 255-7770

DSN 755-7770



FACILITY TYPE:

Heat Transfer R&D Facility

PURPOSE:

Conduct basic and applied heat transfer research
applicable to aircraft power thermal management

FACILITY NAME:

Thermal Laboratory

PRIMARY CAPABILITIES:

Performance and life testing on electronic temperature
and high temperature heat pipes

Thermal energy storage and transient heat transfer
testing

Transient and steady-state thermal testing with heat and
mass transfer modelling

SPECIAL/UNIQUE CAPABILITIES:

Clean room, dry box, and fabrication area

Electronic temperature and liquid metal heat pipe fill
station; cryogenic vacuum chambers for heat pipe testing

Heat transfer fluid processing and purification
apparatus with a full complement of high vacuum
equipment

INSTRUMENTATION:

Vacuum leak detection system, automated data acquisition
and high vacuum pumps

Calorimetry and temperature measurements

Environmental and inert gas atmosphere chamber; optical
pyrometers (non-contact) temperature sensors

AVAILABILITY:

Primarily in-house research

Limited to US Government agency use

LOCATION:

BUILDING: 18G ROOM: 41-46

POINT OF CONTACT:

WL/POOS

WPAFB, OH 45433-6563

(513) 255-2922

DSN 785-2922



FACILITY TYPE:

Pulsed High Voltage

PURPOSE:

Test stand for cathode development

FACILITY NAME:

Cathode Test Stand

PRIMARY CAPABILITIES:

500,000 V pulsed component testing

SPECIAL/UNIQUE CAPABILITIES:

500,000 V pulsed in an ultra-high vacuum environment

INSTRUMENTATION:

Optical and laser diagnostics system

AVAILABILITY:

Primarily for in-house research

Limited use by U.S. Government agencies and their
contractors

LOCATION:

BUILDING: 450 ROOM: D08

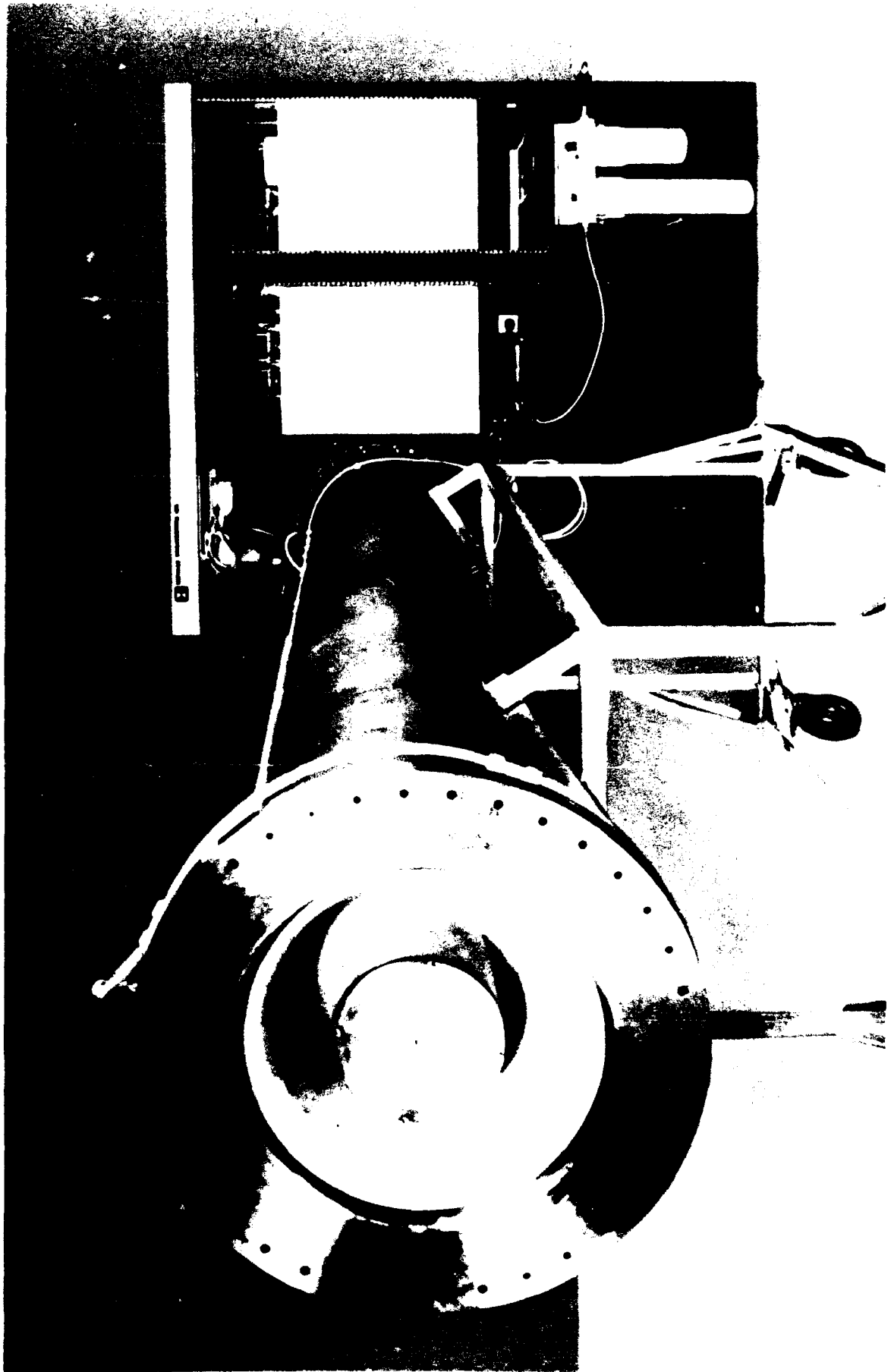
POINT OF CONTACT:

WL/POOX

WPAFB, OH 45433-6563

(513) 255-2923

DSN 785-2923



Cathode Test Stand

FACILITY TYPE:

Electrical Power Systems

PURPOSE:

Develop materials, components and systems for very high power pulsed and steady state electrical systems

FACILITY NAME:

High Power Laboratory

PRIMARY CAPABILITIES:

Develop superconductors, inverters, high energy density inductive and capacitive energy storage and switches

Analyze dielectric breakdown

SPECIAL/UNIQUE CAPABILITIES:

5 MegaWatt/1 KiloVolt, 5 MegaWatt/400 Volt, 1 MegaWatt/0-120 Volt DC power supplies

1.5 MV/400 KV high voltage pulsers

80 KiloJoule high current pulser

INSTRUMENTATION:

Partial discharge analysis system

High voltage DC power supplies

AVAILABILITY:

Primarily in-house research

Limited U.S. Government agency use

LOCATION:

BUILDING: 450 ROOM: H1 Bay

POINT OF CONTACT:

WL/POOX

WPAFB, OH 45433-6563

(513) 255-6235

DSN 785-6235



FACILITY TYPE:

Superconductivity

PURPOSE:

Synthesize various compositions of the high temperature superconductors, measure the electrical and magnetic properties, and determine practical uses

FACILITY NAME:

Superconductivity and Cryogenics Laboratory

PRIMARY CAPABILITIES:

Characterization of cryogenic properties of superconductors

SPECIAL/UNIQUE CAPABILITIES:

Two superconducting coils: 3-inch bore, 10 Tesla coil,
20 kilojoule repetitively pulsed coil

7 inch bore, cryogenically cooled 14 Tesla coil

INSTRUMENTATION:

Computer Controlled Variable Temperature (2-400K) and
Field (0-5 Tesla) Squid Susceptometer

Variable Temperature (10-80K) and Field (0-10 Tesla)
Transport Current Measurement Apparatus

RF Source Sputtering Rig, Optical Microscope, Furnaces

AVAILABILITY:

Air Force Contractors

LOCATION:

BUILDING: 450 ROOM: B08/19

POINT OF CONTACT:

WL/POOX
WPAFB, OH 45433-6563
(513) 255-4450
DSN 785-6235



FACILITY TYPE:

Advanced Propulsion Combustion

PURPOSE:

Test air breathing engine components such as ramjet, turbo-ramjet and scramjet combustors

FACILITY NAME:

Air Breathing Combustor Research Facility

PRIMARY CAPABILITIES:

Test engine component (up to 24 inch diameter, 120 inch length) performance at both high and low altitudes

SPECIAL/UNIQUE CAPABILITIES:

Large scale, direct-connect thrust stand with vitiated air heater and liquid oxygen system capable of measuring up to 20,000 lbf of thrust

Shielded control room provides ability to process classified data

Subsonic or supersonic combustion experiments using either JP- or gaseous hydrogen (0.9 lbm/sec at 450 psia) as fuels

INSTRUMENTATION:

On-line data acquisition system

Computers: Vaxstation 3200 (96 analog inputs); Neff System 470

Lasers: Argon Ion 5 watt; Argon Ion 10 watt

AVAILABILITY:

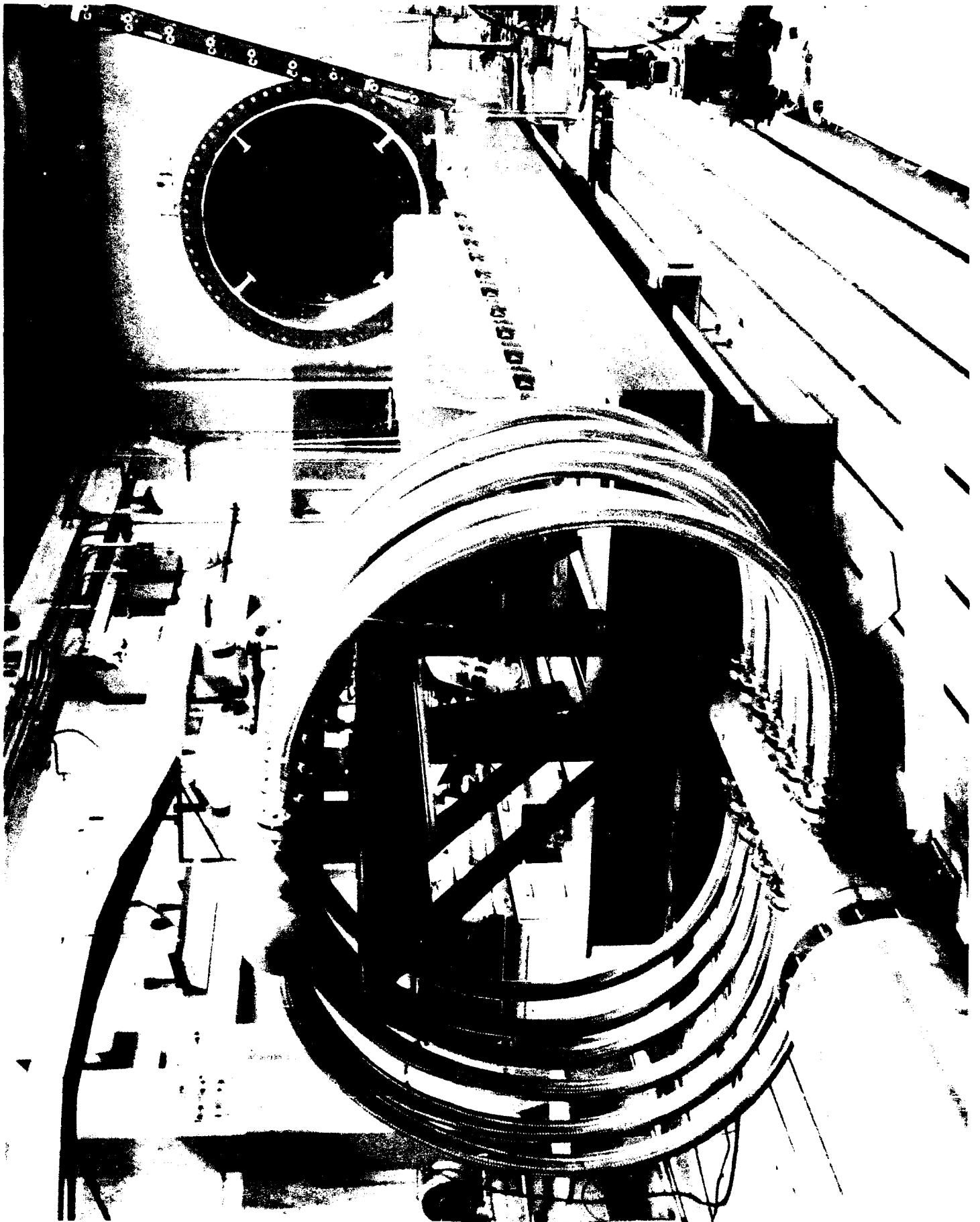
Available to U.S. Government agencies and DOD contractors

LOCATION:

BUILDING: 18E ROOM: 22

POINT OF CONTACT:

WL/POPT
WPAFB, OH 45433-6563
(513) 255-9991
DSN 785-9991



FACILITY TYPE:

Water Tunnel

PURPOSE:

Conduct flow visualization experiments on different engine configurations

FACILITY NAME:

Flow Visualization Research Facility

PRIMARY CAPABILITIES:

Closed loop water tunnel holding over 1200 gallons of water

Flow rate from 30 to 1500 gallons/minute continuously

Rig test cell 23

SPECIAL/UNIQUE CAPABILITIES:

Three separate circuits of visualization enhancement

INSTRUMENTATION:

600 HDC vapor light source; dye, air, and hot water injection

Video camera systems for qualitative diagnostics

AVAILABILITY:

Available to U.S. Government agencies and DOD contractors

LOCATION:

BUILDING: 18E ROOM: 23

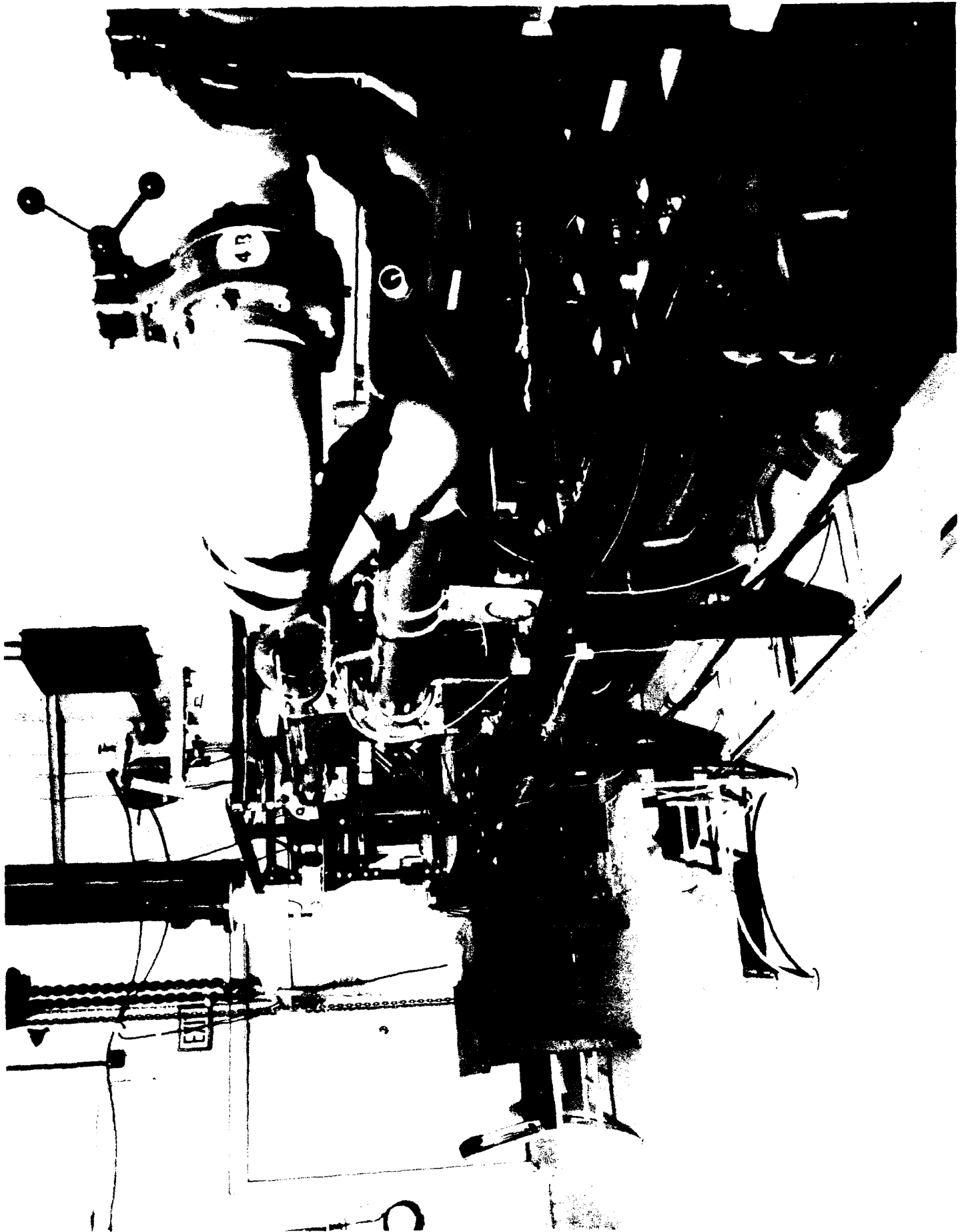
POINT OF CONTACT:

WL/POPT

WPAFB, OH 45433-6563

(513) 255-9991

DSN 785-9991



FACILITY TYPE:

Ramjet combustion

PURPOSE:

Conduct basic and applied research on subsonic ramjet combustors

FACILITY NAME:

Ramjet Combustion Research Facility

PRIMARY CAPABILITIES:

Small scale, direct connect thrust stand (components up to 12 inch diameter and 60 inch length) with vitiated heater and oxygen replenishment system

Inlet temperatures from ambient to 1600 degF and thrust measurements up to 5,000 lbf

Flow capabilities are 15 lbm/sec at 750 psia

SPECIAL/UNIQUE CAPABILITIES:

Fuel injection test stand

Laser Doppler velocimeter

Water cooled test rig for flow field studies

INSTRUMENTATION:

Computers: Vaxstation 3200 (96 analog inputs); Neff System 470

Lasers: Argon Ion 5 watt; Argon Ion 10 watt

AVAILABILITY:

Available to U.S. Government agencies and DOD contractors

LOCATION:

BUILDING: 18C ROOM: 18

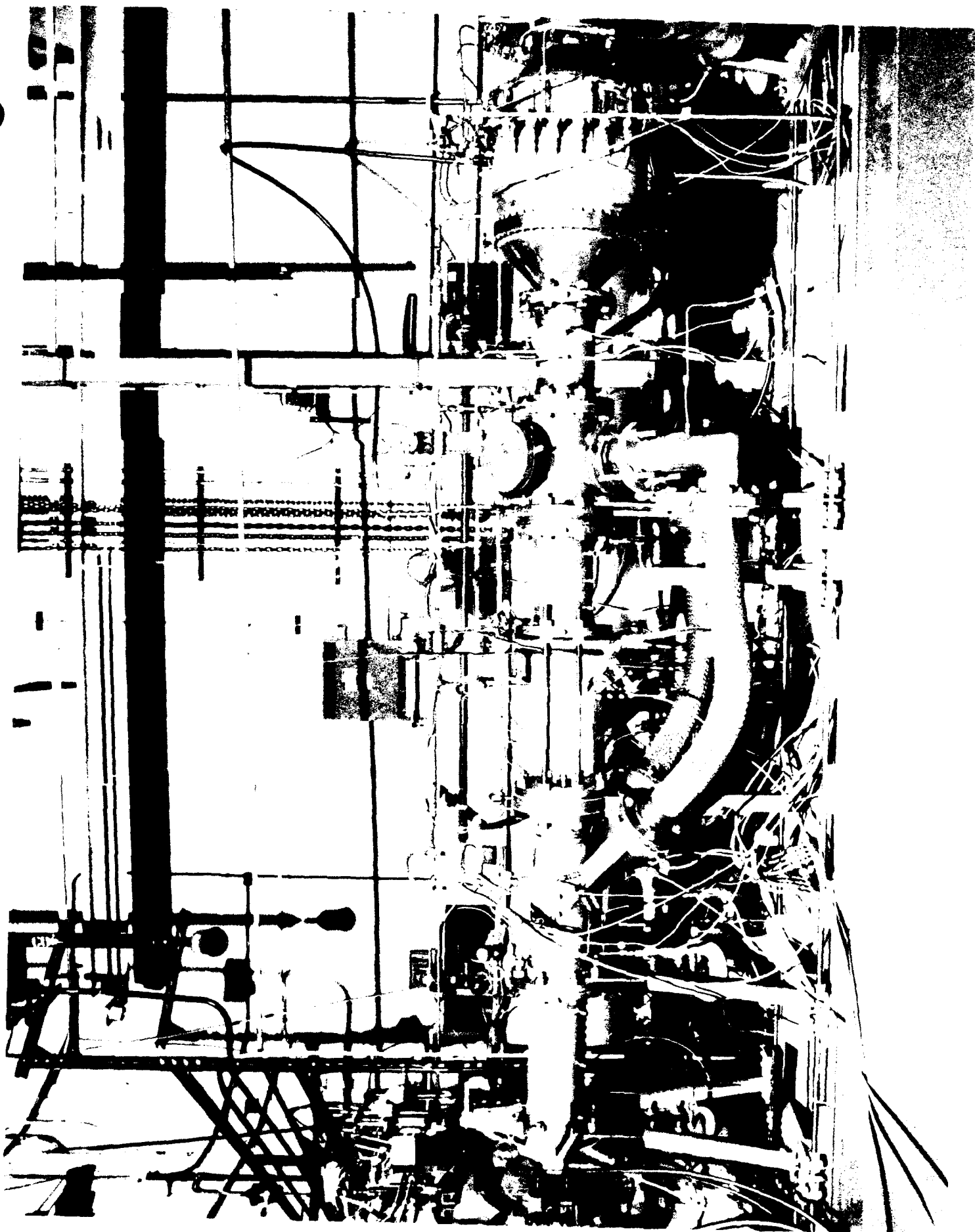
POINT OF CONTACT:

WL/POPT

WPAFB, OH 45433-6563

(513) 255-9991

DSN 785-9991



FACILITY TYPE:

Subsonic and Supersonic Combustion

PURPOSE:

Conduct basic and applied research in the field of subsonic and supersonic combustion

FACILITY NAME:

Subsonic and Supersonic Combustion Research Facility

PRIMARY CAPABILITIES:

Medium: air; flow rates: 1-20 lbm/sec; pressure: up to 750 psia; temperature: up to 1460 deg R

Water for spray cooling as well as recirculated N2 and shop air

SPECIAL/UNIQUE CAPABILITIES:

Facility enclosed in a conditioned environment which will maintain temperature to within less than 1/2 degree

All valving are automatically controlled and parameters are modified using terminal keyboard

Up to a Mach of 3.0 in a 5"x6" test section is attained simply by exchanging nozzles

INSTRUMENTATION:

Controls and computers: Johnson Yokogawa Microxl
Distributed Control System with 1 uXL Operator Station

Lasers: ARGON-LDV and flow visualization;
XEMER-temperature, species concentration and identification; YAG-temperature measurements and species concentration

AVAILABILITY:

Available to US Government agencies and DoD contractors

LOCATION:

BUILDING: 18C ROOM: Cell 19

POINT OF CONTACT:

WL/POPT
WPAFB, OH 45433-6563
(513) 255-9991
DSN 785-9991

FACILITY UNDER CONSTRUCTION
NO PHOTOS AVAILABLE
NEW FACILITY OPERATIONAL IN FALL 1992

FACILITY TYPE:

Combustion

PURPOSE:

Study fundamentals of combustion, provide benchmark quality data for use in validating computational fluid dynamic models

FACILITY NAME:

Combustion Fundamentals Laboratory

PRIMARY CAPABILITIES:

Non-intrusive measurements of combustion-related properties made downstream of small research combustors

Adaptable to research combustors possessing many characteristic of aviation gas turbine combustors

Wide variety of gaseous fuels, including hydrogen, can be burned in research combustor

Maximum fuel rate 200 slpm; maximum air flow rate 11,000 slpm

SPECIAL/UNIQUE CAPABILITIES:

Three component laser Doppler anemometer, and coherent anti-Stokes Raman spectroscopy system

Combustor provides ease of configuration change and burns a large variety of fuels

INSTRUMENTATION:

Flow visualization system using mie scattering

Three component laser Doppler anemometer

Coherent Anti-Stokes Raman Spectroscopy

AVAILABILITY:

Primarily in-house research

Limited use by Government contractors

LOCATION:

BUILDING: 490 ROOM: 153

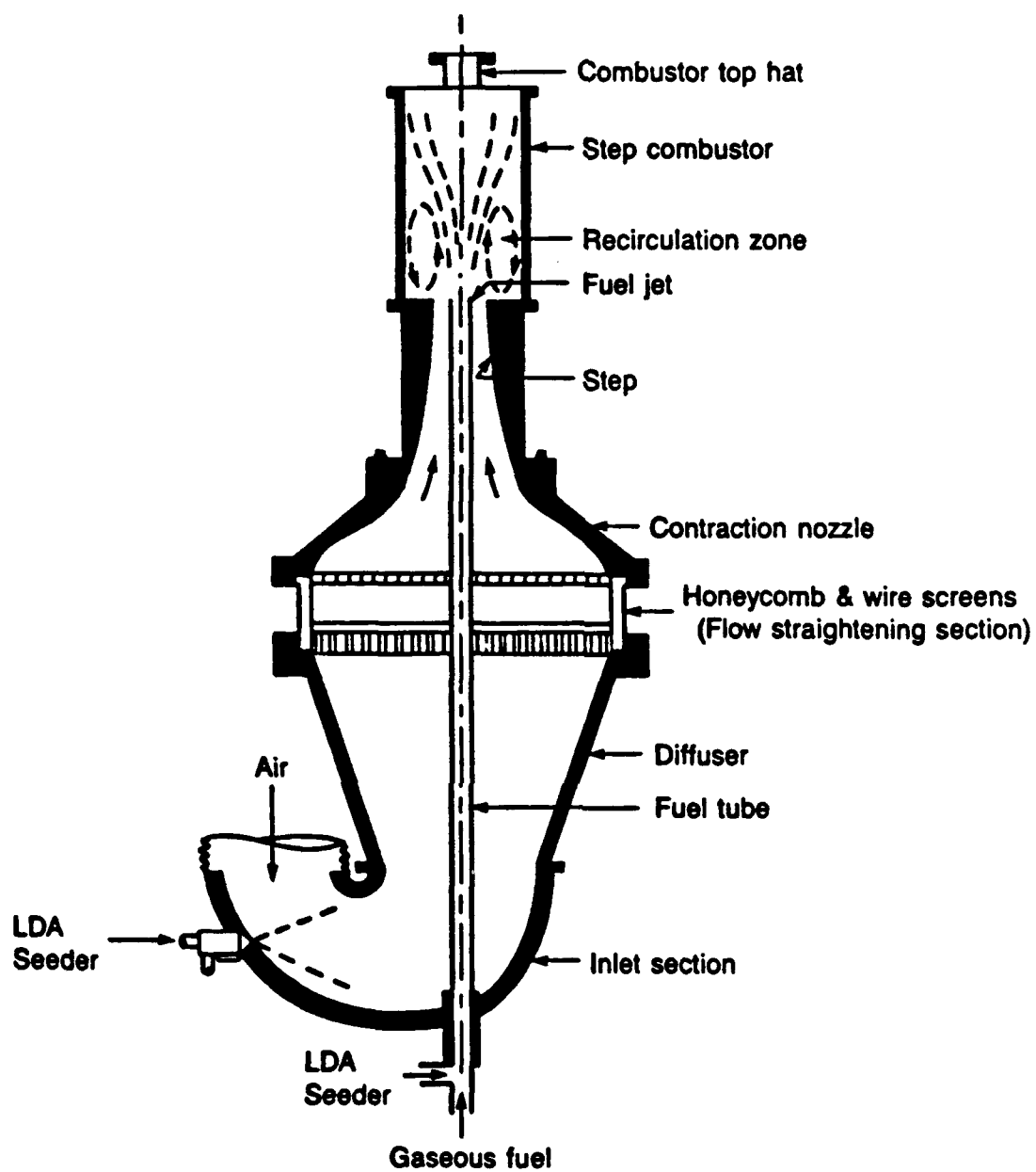
POINT OF CONTACT:

WL/POSF

WPAFB, OH 45433-6563

(513) 255-5106

DSN 785-5106



TURBULENT FLAME BURNER SHOWN WITH A STEP COMBUSTOR

Combustion Fundamentals Laboratory

FACILITY TYPE:

Combustion

PURPOSE:

Provide benchmark quality data from large scale research combustors for use in validating combustion models

FACILITY NAME:

Combustion Research Facility

PRIMARY CAPABILITIES:

Two test air sources: #1 - flow rates up to 34 lbm/sec, pressures up to 750 psig, temperatures up to 1100 deg F;

#2 - flow rates up to 7.5 lbm/sec at 300 psig and ambient temperature

Gaseous fuels and liquid gas turbine fuels available at flow rates up to 40 lbm/hr; nitrogen flow rates up to 10 lb/min at 400 psig

Rig test cell 20

SPECIAL/UNIQUE CAPABILITIES:

Coherent Anti-Stokes Raman and Phase Doppler Particle Analyzer laser diagnostics combination

Detailed data on temperature, velocity, drop size, and drop distribution in reacting and nonreacting environments

Gas analysis instruments available to determine products of combustion using extraction type probes

INSTRUMENTATION:

Mini computer/data acquisition system

Networking provides access to larger main frames

Maximum of 128 separate analog inputs provide temperature, pressure and location measurements

AVAILABILITY:

Primarily in-house research

Limited use by Government contractors

LOCATION:

BUILDING: 18C ROOM: 20

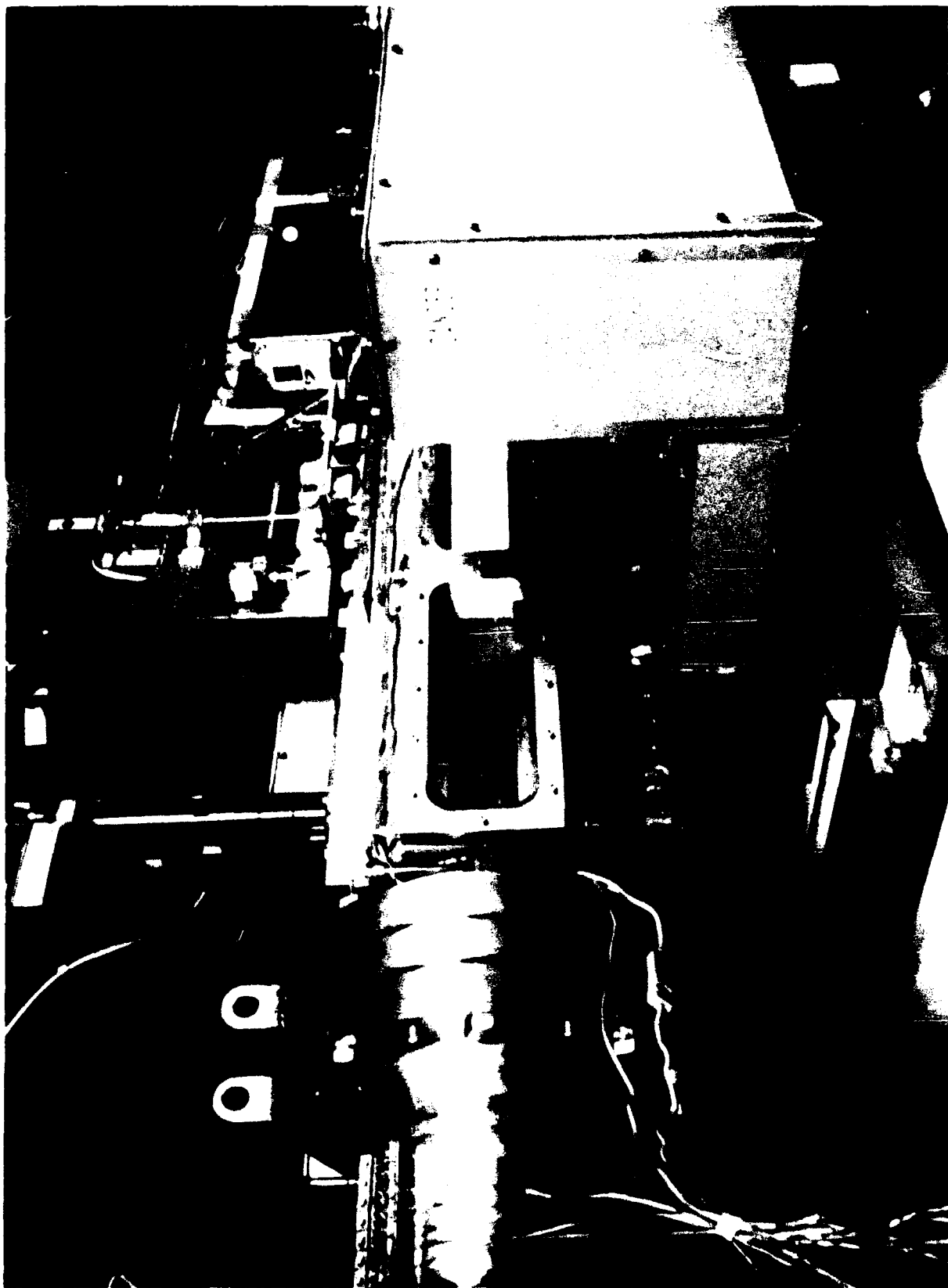
POINT OF CONTACT:

WL/POSF

WPAFB, OH 45433-6563

(513) 255-5106

DSN 785-5106



Combustion Research Facility

FACILITY TYPE:

Fuels

PURPOSE:

To study fuel behavior under conditions similar to those experienced in fuel injectors (for both combustors and augmentors)

FACILITY NAME:

Augmentor Test Rig

PRIMARY CAPABILITIES:

To study fuels and fuel/additive formulations under various conditions of temperature, pressure, flow rate and oxygen content to determine the impact on

(cont) fouling and product formation

SPECIAL/UNIQUE CAPABILITIES:

The device can be operated in the subcritical and supercritical modes

INSTRUMENTATION:

The device was built in-house

It consists of a feed tank, a pump, a preheater, a furnace, back pressure regulators and the peripherals required to monitor pressure and temperature

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 490 ROOM: 108

POINT OF CONTACT:

WL/POSF

WPAFB, OH 45433-6563

(513) 255-3524

DSN 785-3524



Augmentor Test Rig

FACILITY TYPE:

Fuel Spray/Advanced Diagnostics

PURPOSE:

Conduct fundamental research of two phase flows; develop advanced laser diagnostics hardware and techniques for use in fundamental combustion research

FACILITY NAME:

Combustion/Spray Diagnostics Laboratory

PRIMARY CAPABILITIES:

Develop laser diagnostics and quantitative imaging tools

Study reacting and nonreacting, two phase flows and single droplets

Conduct fundamental research of two phase flows including turbulence intensity, transportation and evaporation phenomena

SPECIAL/UNIQUE CAPABILITIES:

Advanced two-dimensional quantitative imaging devices

Measure two velocity components and particle size at a single point

INSTRUMENTATION:

YAG die laser, Argon Ion laser, and optics available for flow visualization and measurements

Small vertical research burner

Two-component Phase Doppler Particle Analyzer, small scale splitter plate

AVAILABILITY:

Primarily in-house research

Potentially available for cooperative US Govt/industry joint research projects

LOCATION:

BUILDING: 450 ROOM: E-130

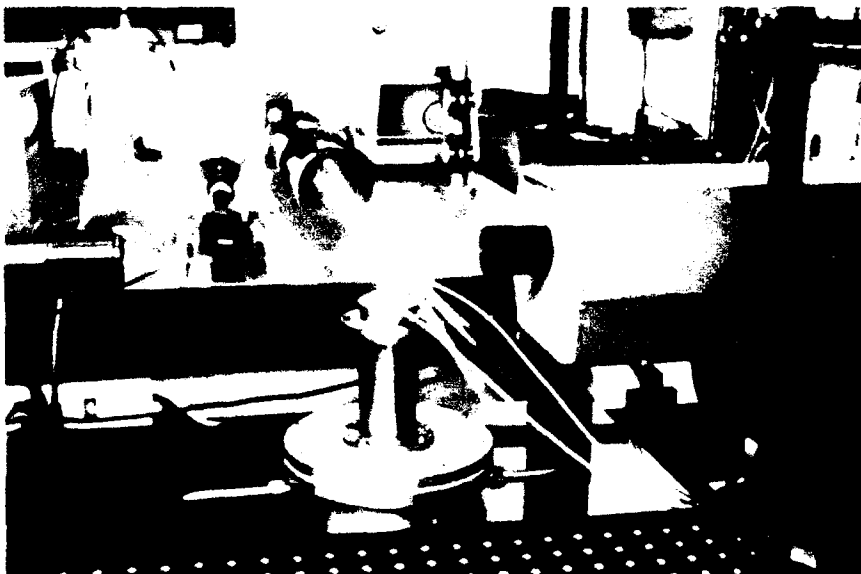
POINT OF CONTACT:

WL/POSF

WPAFB, OH 45433-6563

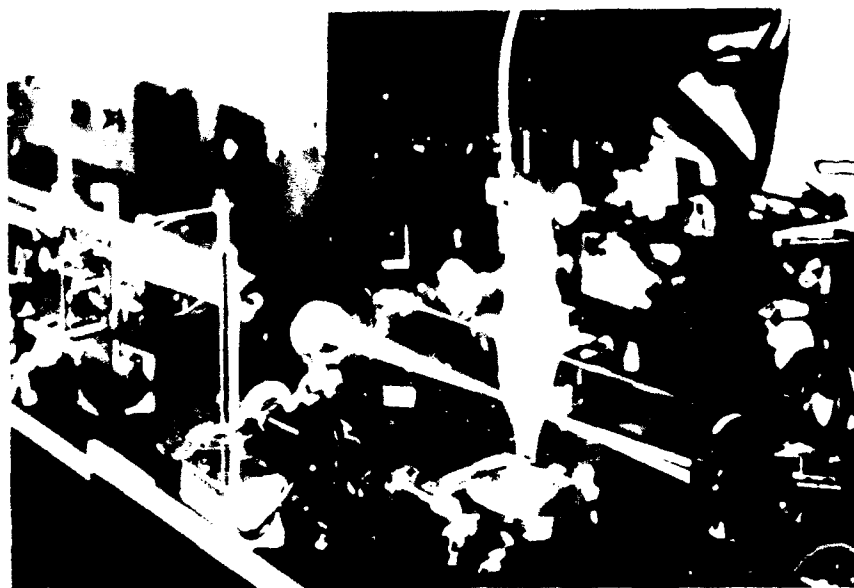
(513) 255-5106

DSN 785-5106



**PHASE DOPPLER PARTICLE ANALYZER
WITH RESEARCH NOZZLE**

Spray Research Lab



**OPTICAL DIAGNOSTIC SYSTEM FOR MAKING
REACTING FLOW MEASUREMENTS**

Combustion Diagnostics Lab

Combustion/Spray Diagnostics Laboratory

FACILITY TYPE:

Fuels

PURPOSE:

Characterize and quantify liquid fuels for Air Force aircraft gas turbine engines; conduct research into the development of advanced fuels for future aircraft

FACILITY NAME:

Fuels Research Laboratory

PRIMARY CAPABILITIES:

Identify fuel constituents qualitatively and quantitatively using gas and liquid chromatographic instruments, infra-red spectroscopy and UV/VIS spectroscopy

Evaluate fuel thermal stability using static and flowing tests under extreme conditions

SPECIAL/UNIQUE CAPABILITIES:

Sophisticated chemometric software is available to determine relationships between chemical composition and fuel performance

Customized data reduction software is available to automatically calculate retention indices and retrieve the best match from a standards library

Special instrumentation available to thermally stress fuels under a variety of conditions to study high temperature chemistry and evaluate deposition tendencies

INSTRUMENTATION:

High-performance liquid chromatograph, high resolution gas chromatograph, gas chromatograph with mass selection detector, elemental analyzer

Multi-dimensional gas chromatograph with flame ionization and mass selective detection, gas chromatograph with atomic emission detection

System for thermal diagnostic studies, isothermal oxidation test rig, Fourier-transform infra-red analyzer, UV/VIS spectrophotometer, micro carbon residue tester

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 490 ROOM: 205-8

POINT OF CONTACT:

WL/POSF
WPAFB, OH 45433-6563
(513) 265-3190
DSN 785-3190



Fuels Research Laboratory

FACILITY TYPE:

Facility

PURPOSE:

Evaluate the elevated temperature storage characteristics of fuels

FACILITY NAME:

Fuel Storage Oven

PRIMARY CAPABILITIES:

Store drum quantities of fuel in an elevated temperature environment for determination of long term storage characteristics

SPECIAL/UNIQUE CAPABILITIES:

Drum quantities of fuel can be stored at temperatures as high as 130 degF

INSTRUMENTATION:

Barlow Temperature Controller

AVAILABILITY:

In-house research activities

LOCATION:

BUILDING: 490 ROOM: 160

POINT OF CONTACT:

WL-POSE

WPAFB, OH 45433-6563

F133 255-5106

DDN 135-5106



Fuels Storage Oven

FACILITY TYPE:

Fuels

PURPOSE:

Evaluate the thermal behavior of fuels in a controlled high temperature environment and endothermic fuel/catalyst systems

FACILITY NAME:

Fuels Thermal and Catalytic Research Laboratory

PRIMARY CAPABILITIES:

Evaluate wide variety of fuels for thermal stability and degradation over a wide range of temperatures, pressures, and resident times

SPECIAL/UNIQUE CAPABILITIES:

Interchangeable reaction cells allow greater flexibility in experiment design

Atmospheric Pressure Pyrolysis, High-Pressure Liquid-Phase Pyrolysis, Atmospheric Pressure Catalysis, High-Pressure Liquid-Phase Catalysis

Reaction cells can be designed to model specific applications; solid, liquid, and gas-phase fuels can be tested

INSTRUMENTATION:

System for Thermal Diagnostic Studies (STDS) configured for flame ionization, mass selective, and infrared spectra detectors

State-of-the-art Fourier transform infrared spectrometer covering visible to far-IR frequencies

AVAILABILITY:

High priority projects from any government agency can be scheduled

Projects scheduled on a limited basis

LOCATION:

BUILDING: 490 ROOM: 106

POINT OF CONTACT:

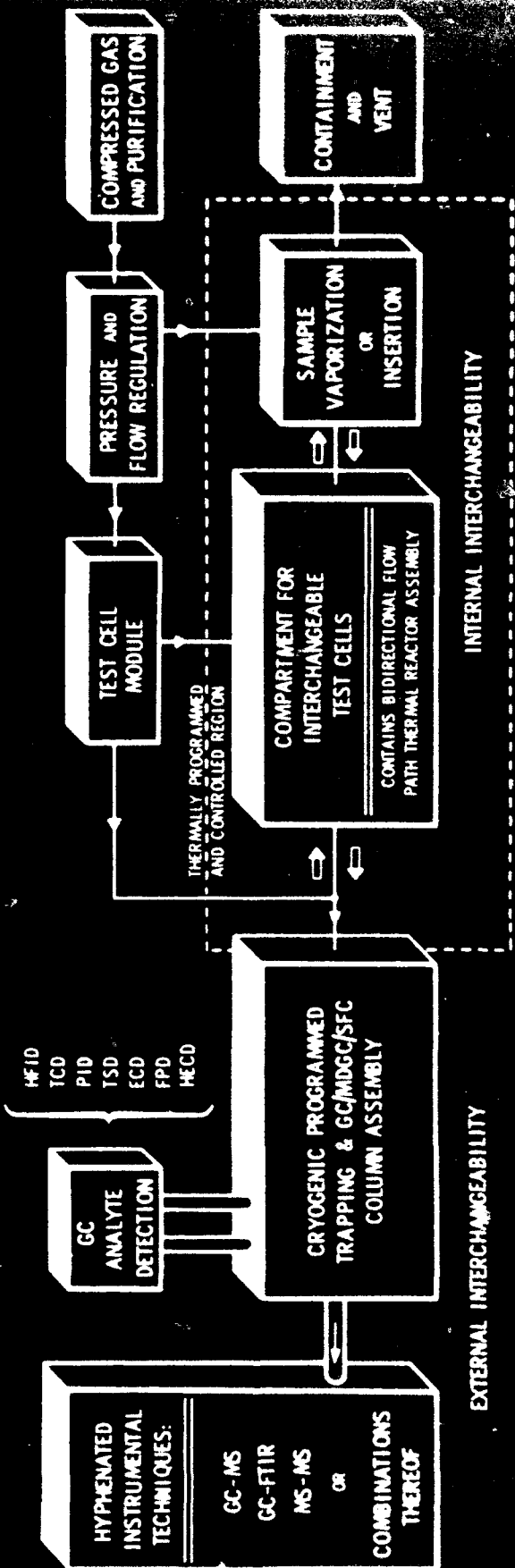
WL POSF

WFAFB, OH 45433-6563

(613) 155-5105

DSN 785-5106

System for Thermal Diagnostic Studies (STDs)



FACILITY TYPE:

Fuels

PURPOSE:

Makes research quantities of test fuels

FACILITY NAME:

Hydrogenation Research System (HRS)

PRIMARY CAPABILITIES:

Simulate a wide range of typical refinery technologies

Add hydrogen and remove sulfur, nitrogen and oxygen from fuels

Evaluate catalysts, dehydrogenation kinetics and process candidate endothermic fuels

SPECIAL/UNIQUE CAPABILITIES:

HRS is state-of-the-art pilot plant which can be converted for hydrogenation or dehydrogenation studies

INSTRUMENTATION:

Two downflow trickle bed reactors in series in computer controlled plant contain travelling thermocouples to monitor temperature in beds

Flow scheme set to use either one or two reactors

AVAILABILITY:

Primarily in-house research

Potentially available for limited use by Government contractors

LOCATION:

BUILDING: 490 ROOM: 150

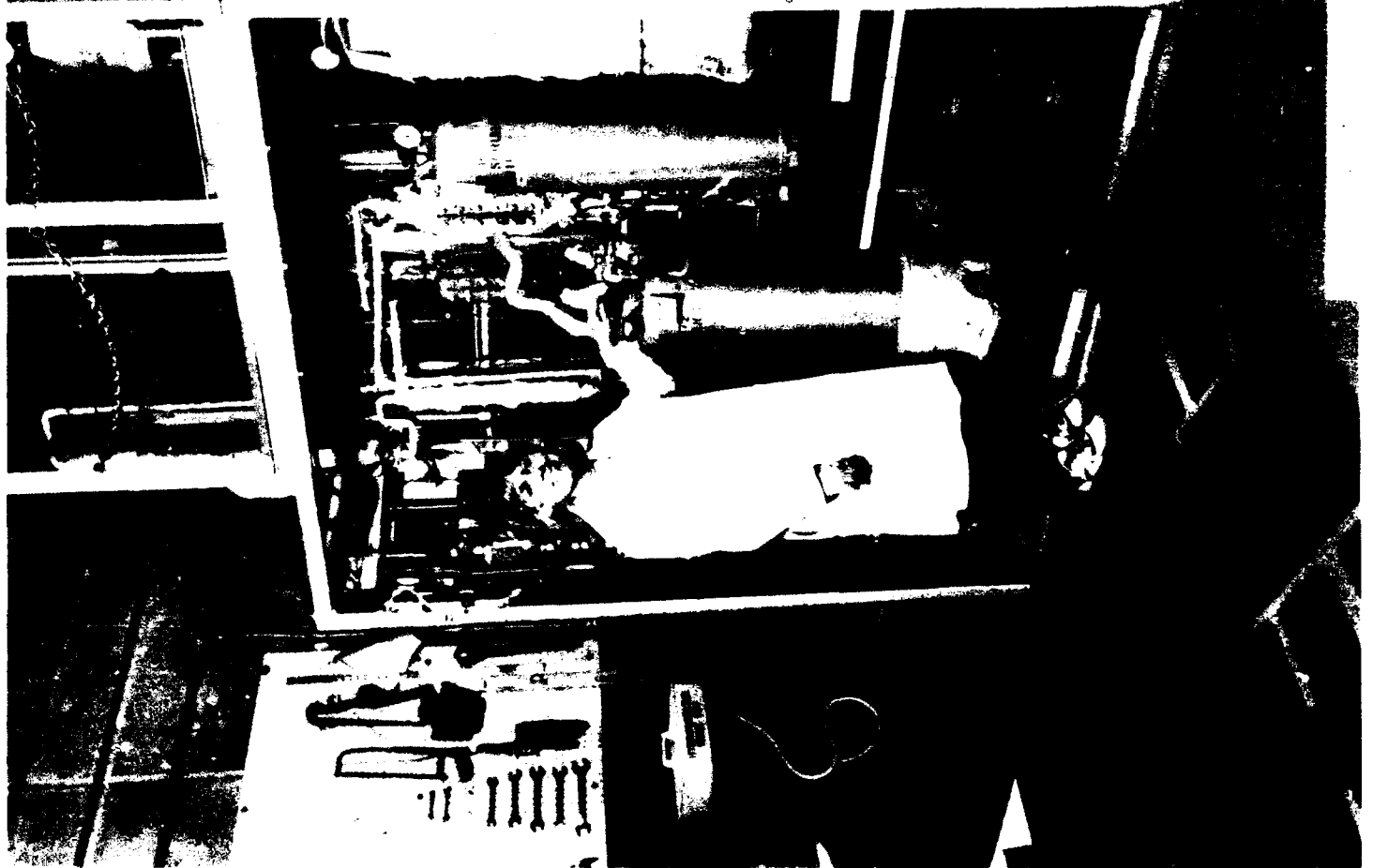
POINT OF CONTACT:

WL/POSF

WPAFB, OH 45433-6563

(513) 255-3527

DSN 785-3527



FACILITY TYPE:

Fuels

PURPOSE:

To study fuel behavior under conditions similar to those experienced in aircraft heat exchangers

FACILITY NAME:

Phoenix Test Rig

PRIMARY CAPABILITIES:

To study fuels and fuel/additive formulations under various conditions of time, temperature, pressure and oxygen content to determine the impact on fouling

(cont) and product formation

SPECIAL/UNIQUE CAPABILITIES:

A special gas chromatograph is installed in-line to measure oxygen consumption and volatile gas production

The test sections (hot and cold) and filter elements (hot and cold) can be removed and the amount of deposition measured by carbon burnoff

The device is designed to permit optical access for laser diagnostic studies of high-temperature fuel chemistry; test rig can be operated for periods up to 48hrs

INSTRUMENTATION:

Device built in-house

Consists of preconditioning tank, a pump preheater, a copper block heater or fluidized sand bath, a gas chromatograph and peripherals to monitor pressure & temp

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 490 ROOM: 152

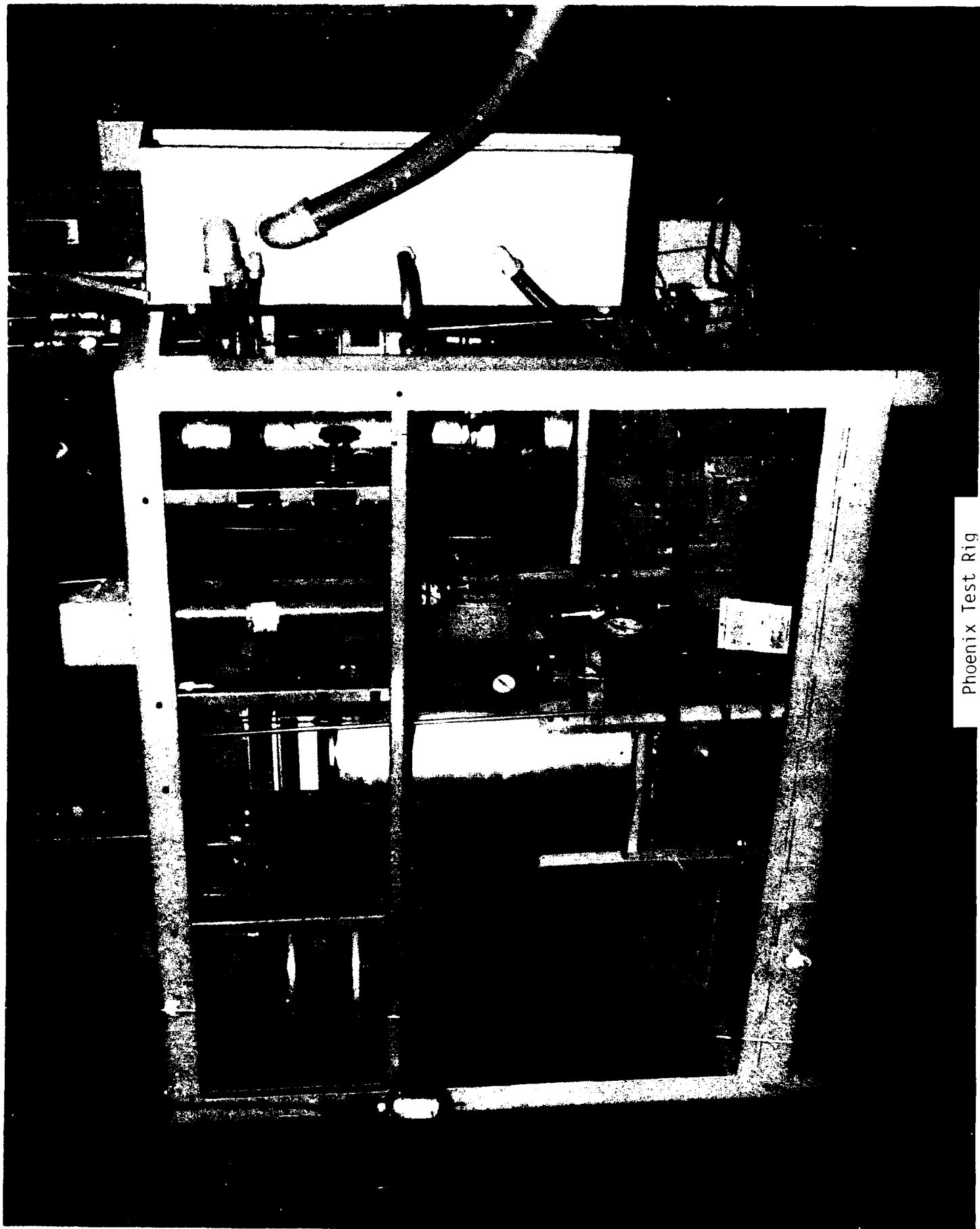
POINT OF CONTACT:

WL/POSF

WPAFB, OH 45433-6563

(513) 255-3190

DSN 785-3190



Phoenix Test Rig

FACILITY TYPE:
Fuels

PURPOSE:
Evaluate fuel physical and chemical characteristics within various components of an aircraft fuel system under a variety of standard and extreme conditions

FACILITY NAME:
Reduced Scale Aircraft Engine/Airframe Fuel System Simulator (RSS)

PRIMARY CAPABILITIES:
Thermally stress fuel in a "real mission" mode

Emulate a large portion of the complete aircraft fuel system

SPECIAL/UNIQUE CAPABILITIES:
Evaluate thermal decomposition of fuels under simulated aircraft conditions, evaluate ways of maximizing and utilizing fuel as a heatsink

Examine fuel system hardware configurations

Evaluate new fuel system designs and retrofits on current fuel systems using minimal amounts of fuel

INSTRUMENTATION:
Conditioning tanks, heated wing tank, body tank

Environmental chamber, small orifice simulator, nozzle screen simulator

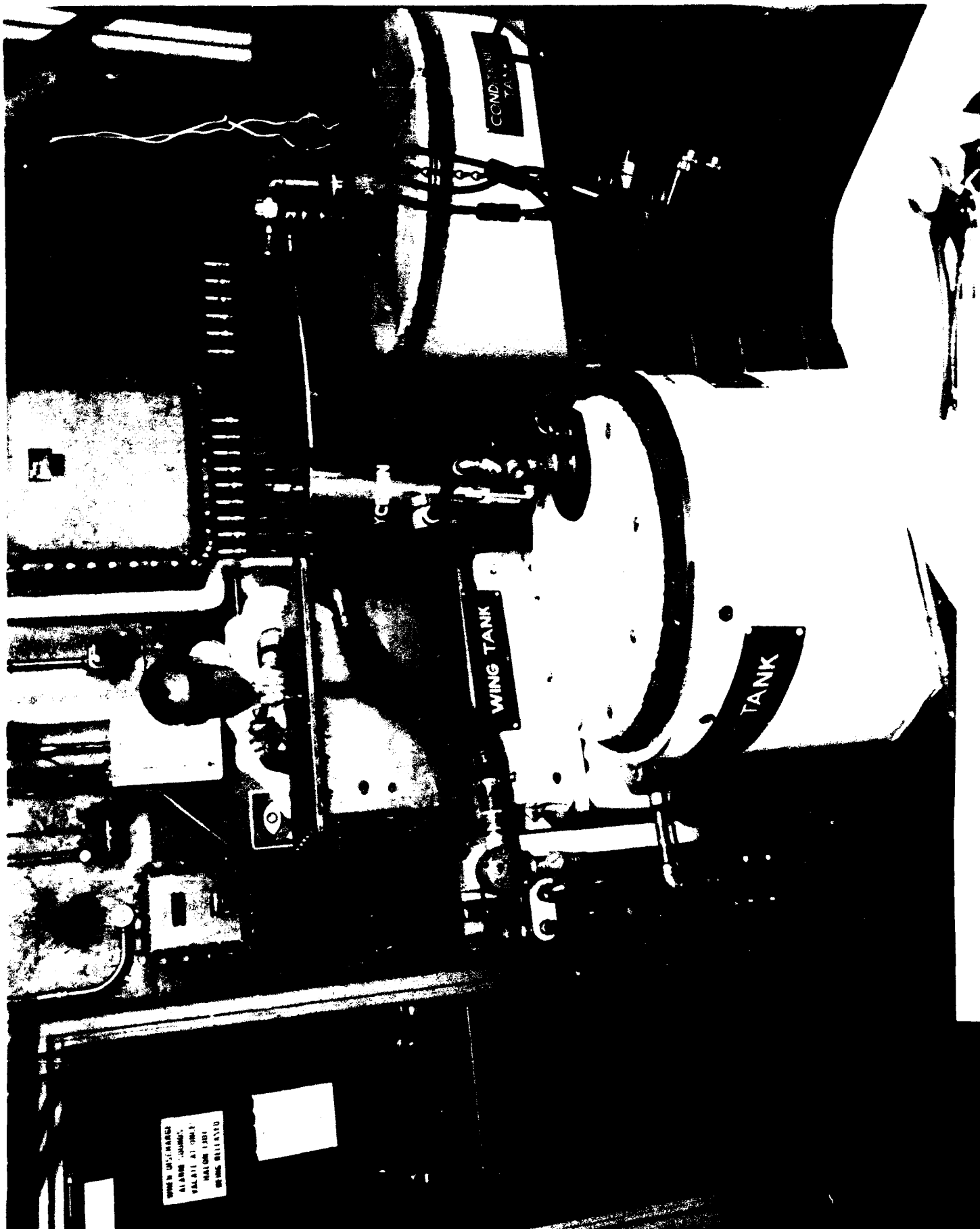
Fuel cooled oil cooler, generic tube heater

AVAILABILITY:
Primarily in-house research

Potentially available for limited use by Government contractors

LOCATION:
BUILDING: 490 ROOM: 150

POINT OF CONTACT:
WL/POSF
WPAFB, OH 45433-6563
(513) 255-3527
DSN 785-3527



FACILITY TYPE:

Bearings

PURPOSE:

Evaluate subscale bearing and/or gear specimens for rolling contact fatigue resistance

FACILITY NAME:

Bearing and Gear Material Fatigue Tester

PRIMARY CAPABILITIES:

Evaluate coating adherence, liquid lubricant performance, and bearing steel life characteristics under rolling contact fatigue

SPECIAL/UNIQUE CAPABILITIES:

Rolling Contact Fatigue Tester-rotating cylindrical test specimen alternately stressed by rolling contact with 3 radially loaded balls or 2 crowned discs;

(cont) temperature capability of 700 deg F

INSTRUMENTATION:

Accelerometer coupled with a shutdown device to monitor vibration caused by fatigue

Temperature controller

AVAILABILITY:

In-house use only

LOCATION:

BUILDING: 490 ROOM: 124

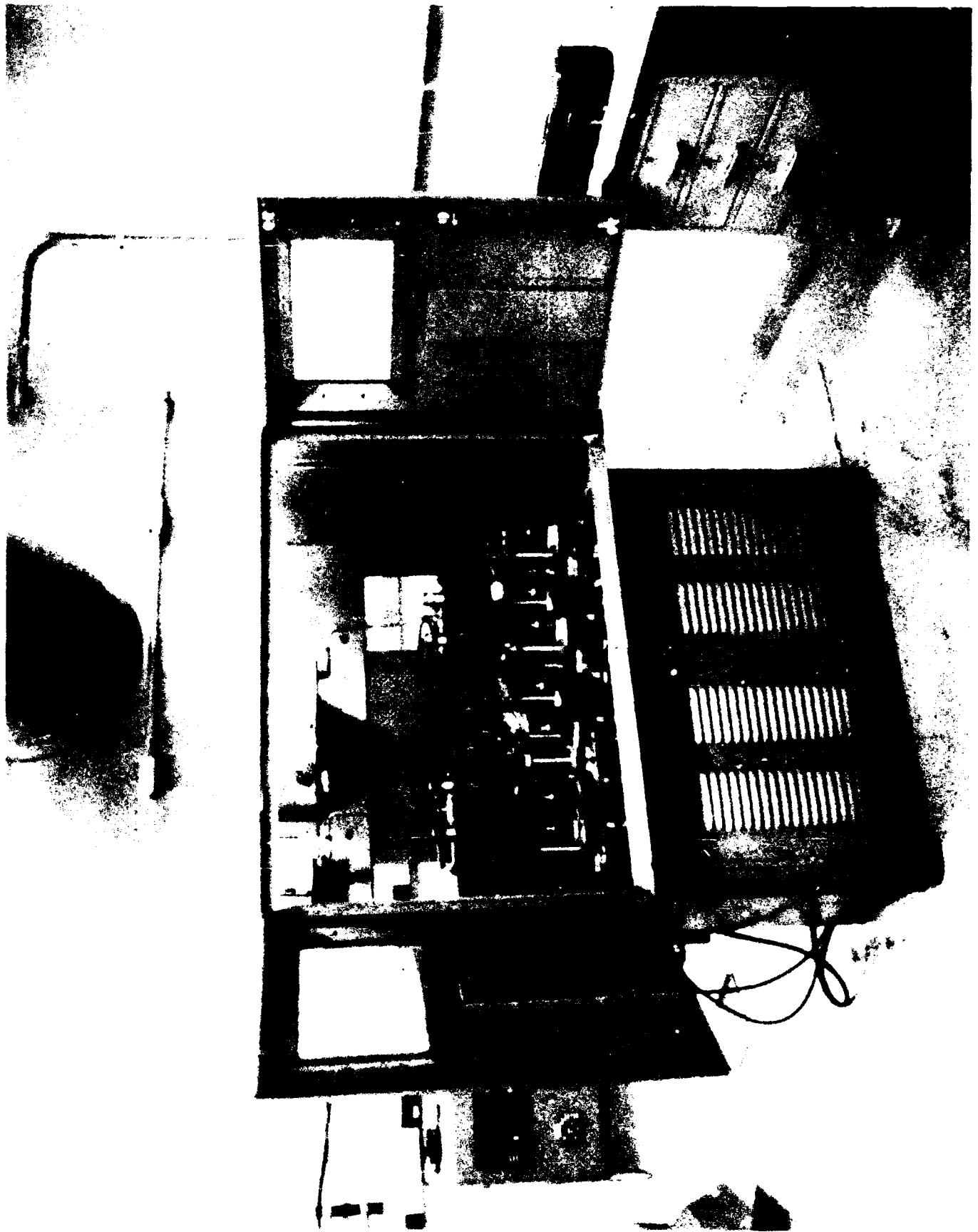
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-6519

DSN 785-6519



Bearing and Gear Material Fatigue Tester

FACILITY TYPE:

Bearings

PURPOSE:

Provide full-scale test capability for performance analysis and evaluation of full-scale aircraft bearings; provide data to validate dynamic computer codes

FACILITY NAME:

Full-Scale Bearing Tester

PRIMARY CAPABILITIES:

Accomodate full-scale bearings (typically 100 mm bore)

Test bearings under actual engine operating speed conditions

SPECIAL/UNIQUE CAPABILITIES:

Fifty hp dc motor driving a test head to 30,000 rpm

Roller slip and cage radial and axial displacement can be measured and monitored during testing

INSTRUMENTATION:

Radial and axial eddy-current probes to measure displacement of the bearing cage during test

Oscilloscope and FM recorder

AVAILABILITY:

In-house use only

LOCATION:

BUILDING: 490 ROOM: 127

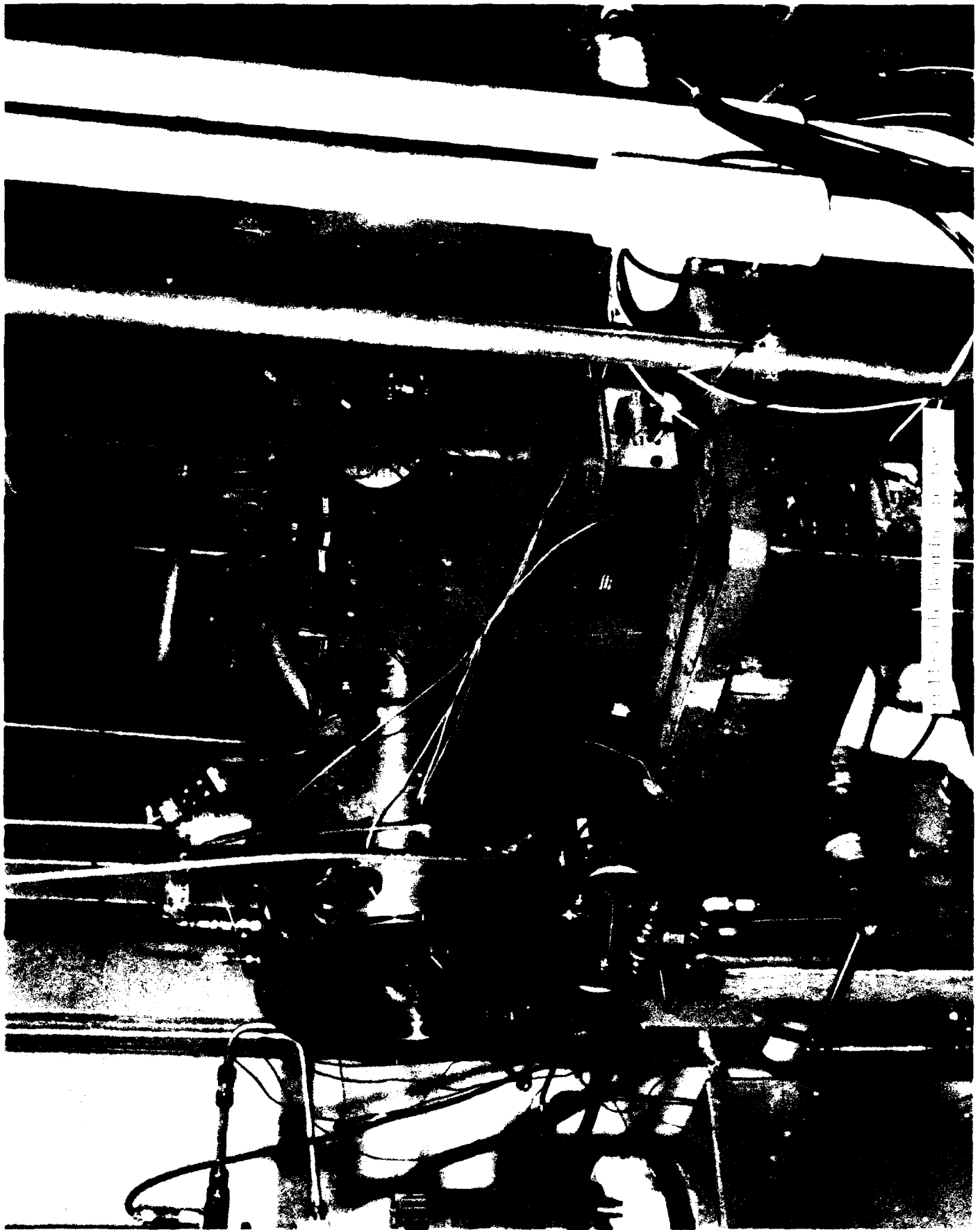
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-6519

DSN 785-6519



FACILITY TYPE:

Bearings

PURPOSE:

Provide data on viscosity and density of liquid lubricants at very high pressures

FACILITY NAME:

High Pressure Viscometer

PRIMARY CAPABILITIES:

Measure viscosity and density at pressures up to 435,000 psi at temperatures up to 325 degF

Measure viscosity up to 10×10^6 poise

SPECIAL/UNIQUE CAPABILITIES:

Pressure chamber 3/4 in dia by 5 in long filled with experimental lubricants

INSTRUMENTATION:

Linear Variable Differential Transformer to measure velocity of sinker falling in lubricant at high pressure

AVAILABILITY:

In-house use only

LOCATION:

BUILDING: 490 ROOM: 136

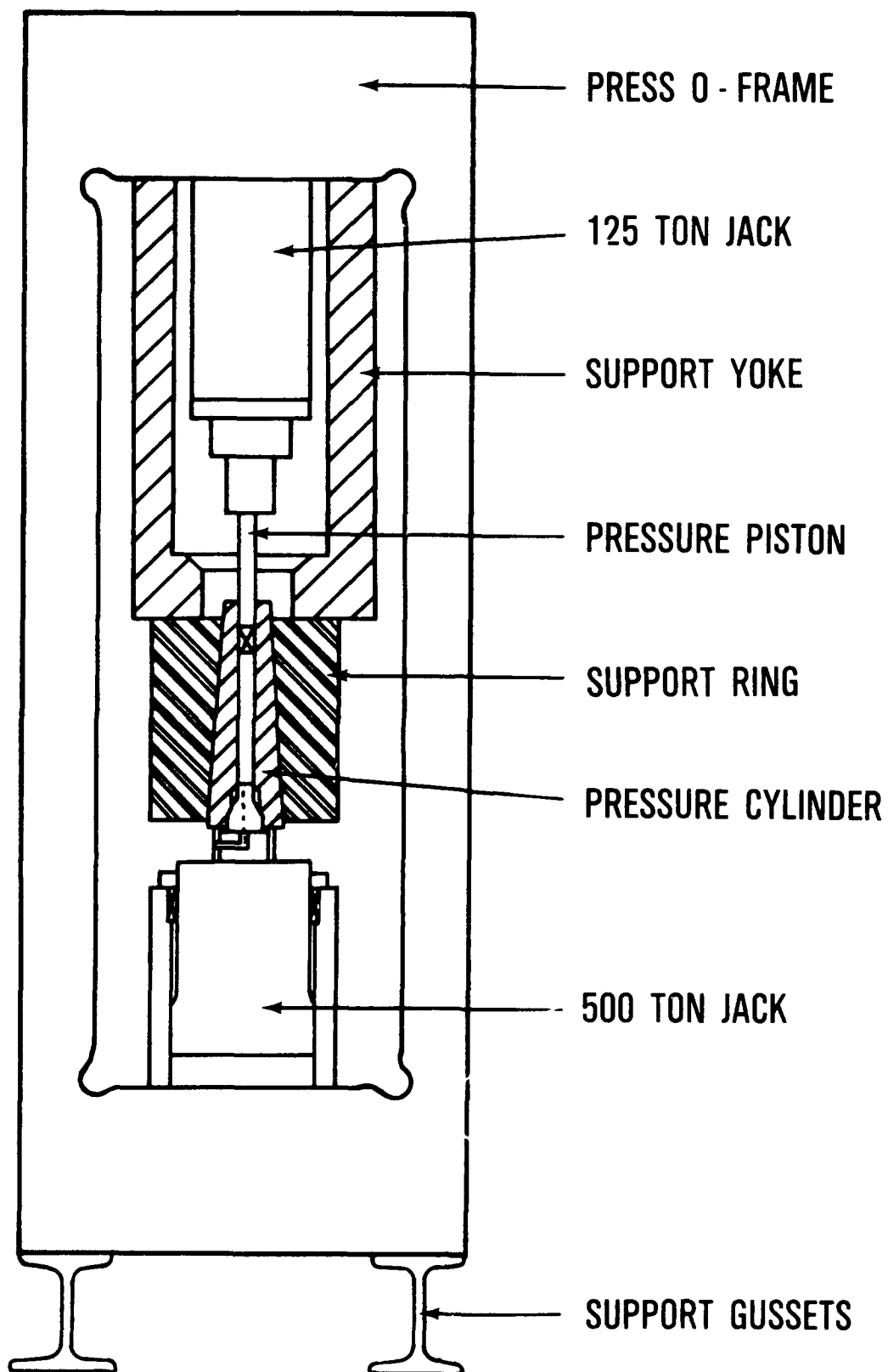
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-7477

DSN 785-7477



High Pressure Viscometer

FACILITY TYPE:

Bearings

PURPOSE:

Evaluate subscale high temperature bearing and/or gear specimens for wear and rolling contact fatigue resistance

FACILITY NAME:

High Temperature Bearing and Gear Material Wear and Fatigue Tester

PRIMARY CAPABILITIES:

Evaluate high temperature coating adherence, solid lubricant performance and high temperature bearing material life, friction and wear characteristics

(cont) under rolling contact

SPECIAL/UNIQUE CAPABILITIES:

Room temperature to 1400 deg F

Rotating cylindrical test specimen alternately stressed by rolling contact with 3 radially loaded balls

Air bearing support provides friction measurement capability

INSTRUMENTATION:

Accelerometer coupled with a shutdown device to monitor vibration caused by wear or fatigue

Thermocouples, load cell for friction measurements and 5KW induction heater temperature controller

AVAILABILITY:

In-house use only

LOCATION:

BUILDING: 490 ROOM: 128

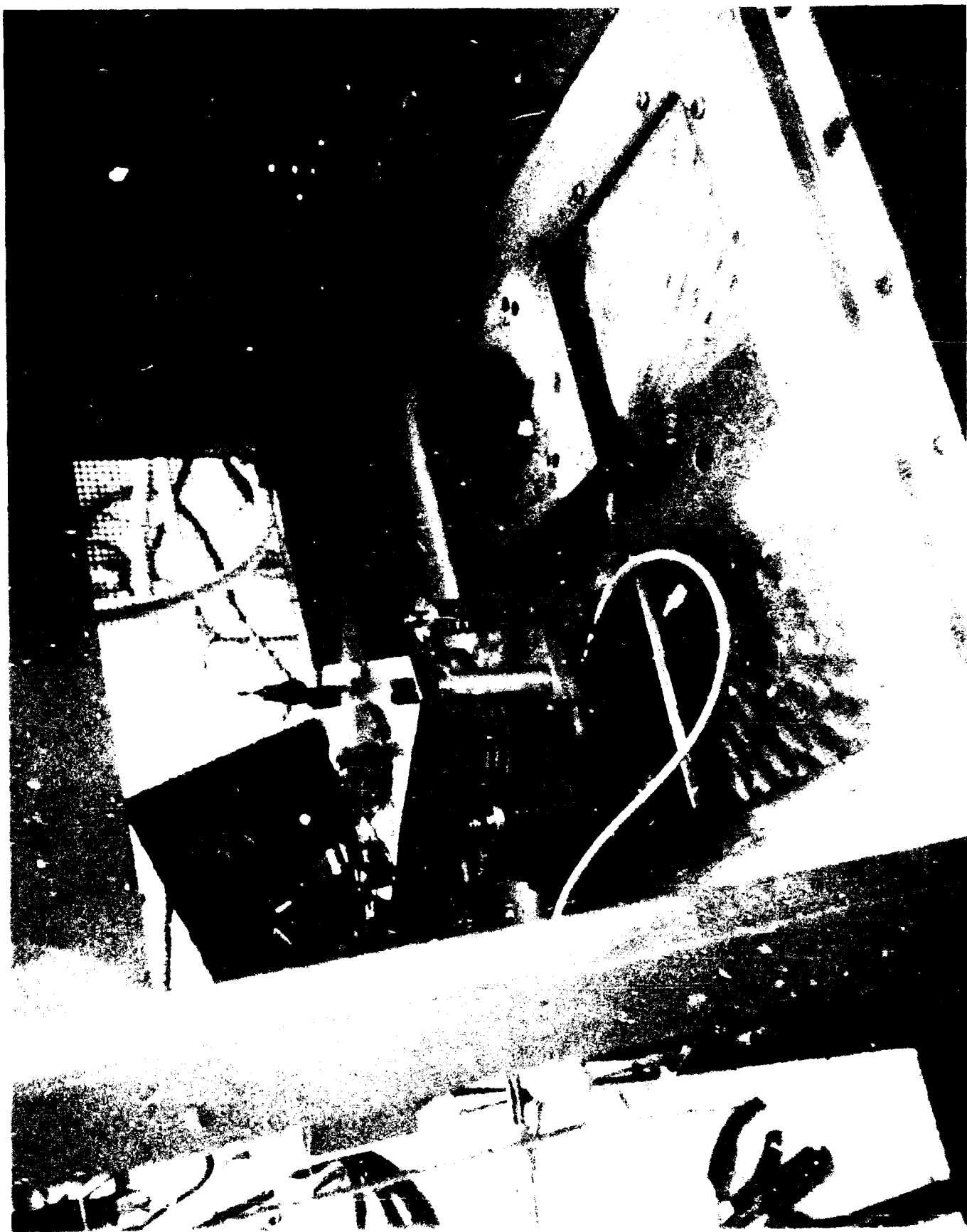
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-6519

DSN 785-6519



High Temperature Bearing and Gear Material Wear and Fatigue Tester

FACILITY TYPE:

Bearings

PURPOSE:

Evaluate lubricant film thickness and traction under rolling and sliding contacts

FACILITY NAME:

Optical EHD Test Rig

PRIMARY CAPABILITIES:

Measure lubricant film thickness via optical interferometry

Measure traction (analogous to lubricant friction)

SPECIAL/UNIQUE CAPABILITIES:

Speed capability up to 1100 in/sec; contact pressures up to 300 ksi; temperatures in excess of 1000 deg F

INSTRUMENTATION:

35mm camera, video camera

Microscope, thermocouples, torque sensor, shaft speed sensors

AVAILABILITY:

In-house use only

LOCATION:

BUILDING: 490 ROOM: 133

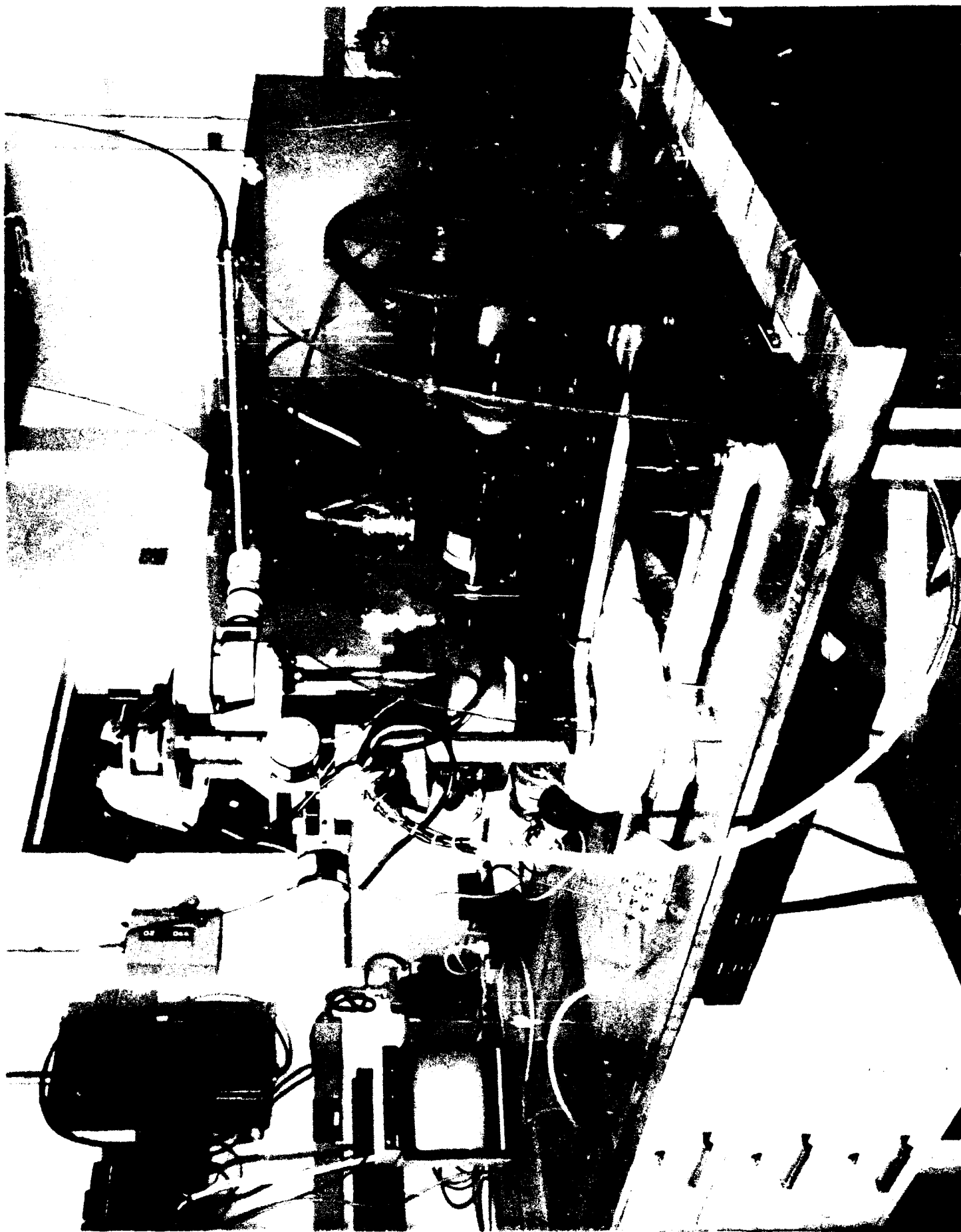
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-1286

DSN 785-1286



FACILITY TYPE:

Bearings

PURPOSE:

Provide traction measurements under high speed, high load conditions for military lubricants

FACILITY NAME:

Traction Test Rig

PRIMARY CAPABILITIES:

Measure traction values at pressures up to 400 ksi and rolling speeds of 4000 in/sec

SPECIAL/UNIQUE CAPABILITIES:

Only test rig capable of generating extreme pressures and rolling speeds for advanced bearing operating conditions

INSTRUMENTATION:

Torque sensor, load cell, desk top computer data acquisition and automatic control system

AVAILABILITY:

In-house use only

LOCATION:

BUILDING: 490 ROOM: 135

POINT OF CONTACT:

WL/POSL
WPAFB, OH 45433-6563
(513) 255-7477
DSN 785-7477



FACILITY TYPE:

Lubricants

PURPOSE:

Analyze engine wear metal to determine wear mechanisms
and engine condition

FACILITY NAME:

Ferrography Facility

PRIMARY CAPABILITIES:

Microscopic examination and identification of wear
metals contained in used oil samples for engine
condition monitoring

SPECIAL/UNIQUE CAPABILITIES:

Duplex ferrograph

INSTRUMENTATION:

Analytical ferrograph, direct reading ferrograph,
ferroscope

AVAILABILITY:

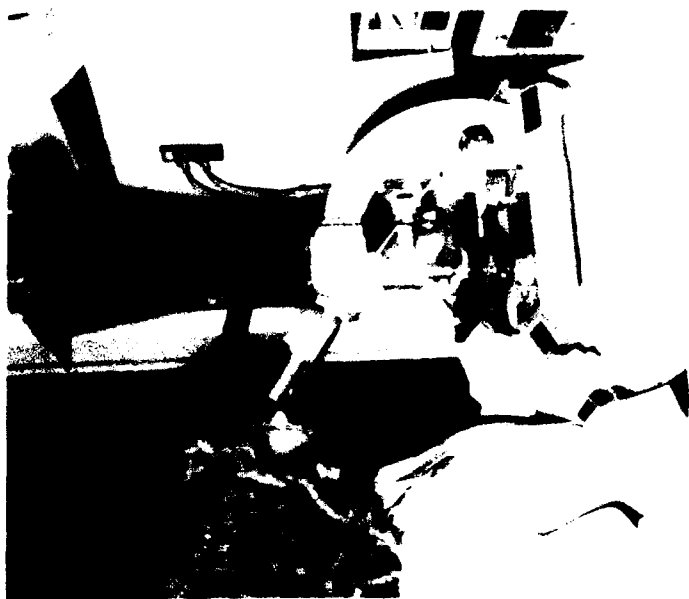
In-house or on-site contractor use only

LOCATION:

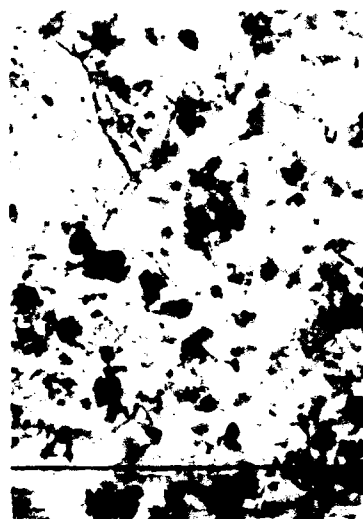
BUILDING: 490 ROOM: 225

POINT OF CONTACT:

WL/POSL
WPAFB, OH 45433-6563
(513) 255-4939
DSN 785-4939



BICHROMATIC MICROSCOPE



NON-WEAR PARTICLES



FERROGRAPH



FERROGRAPHY

FACILITY TYPE:

Lubricants

PURPOSE:

Gas chromatographic analysis with atomic emission detection of lubricant components and additives

FACILITY NAME:

Gas Chromatographic Atomic Emission Detector (GC/AED)

PRIMARY CAPABILITIES:

Gas chromatographic separation of lubricant components and their additive packages

Simultaneous detection of up to 15 eluting chromatographic components by atomic emission detection

SPECIAL/UNIQUE CAPABILITIES:

Computer controlled; computer data acquisition; atomic assay information for lubricant components

INSTRUMENTATION:

Gas chromatograph

Atomic Emission Detector (AED)

Associated computers, controllers, and printers

AVAILABILITY:

In-house or on-site contractor only

LOCATION:

BUILDING: 490 ROOM: 235

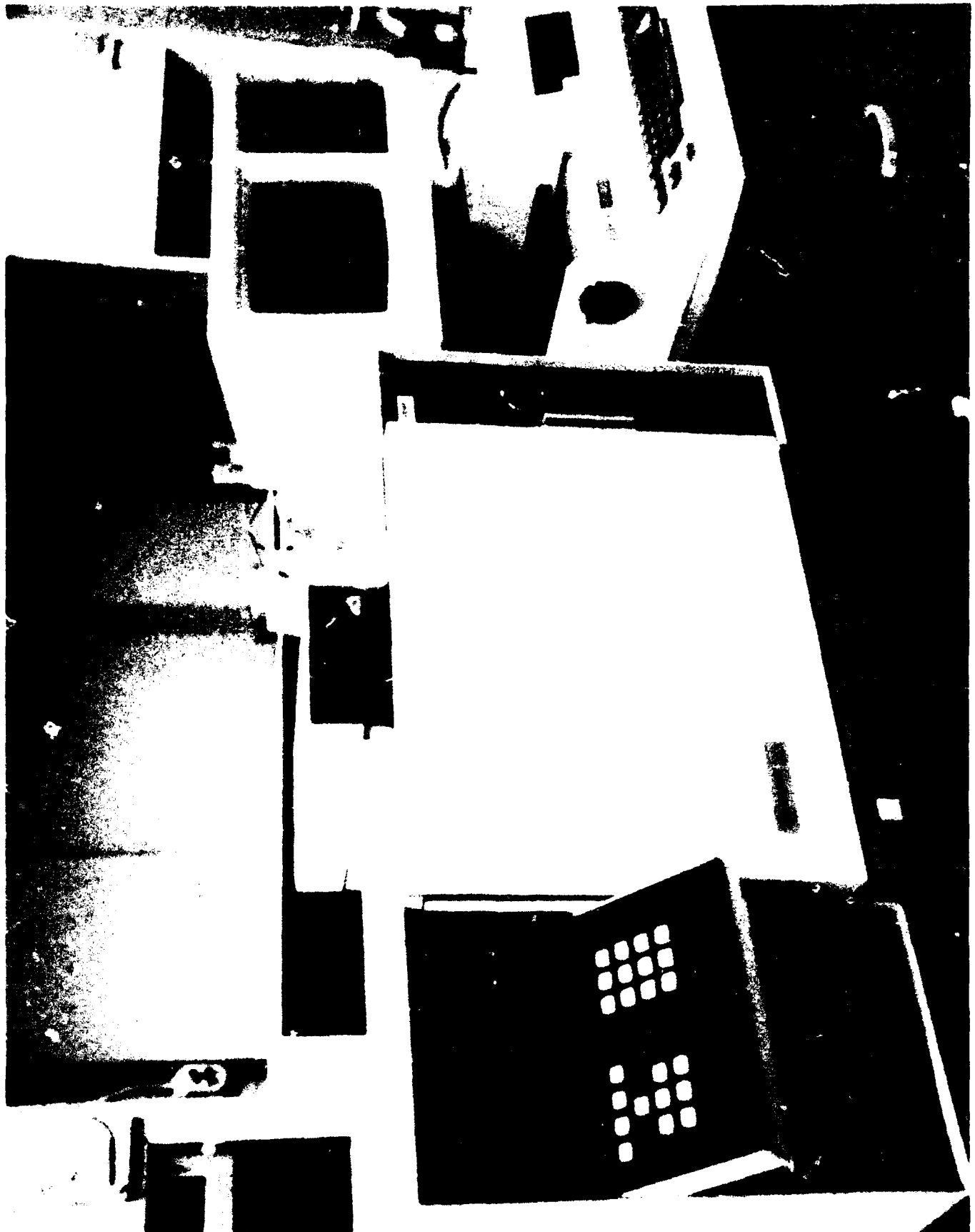
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-4939

DSN 785-4939



Gas Chromatographic Atomic Emission Detector (GC/AED)

FACILITY TYPE:

Bearings

PURPOSE:

Evaluate bearing materials and lubricants at high speed and high temperature using full-scale bearings

FACILITY NAME:

High Temperature High Speed Bearing Test Rig

PRIMARY CAPABILITIES:

Test full-scale bearings (30 mm bore) at simulated engine conditions

SPECIAL/UNIQUE CAPABILITIES:

Air turbine driving a test bearing to over 50,000 rpm at temperatures up to 1500 deg F with 500 lb axial load and 50 lb radial load

INSTRUMENTATION:

Shaft speed sensor, thermocouples including slip ring assembly for under race temperature measurement, load cells, and indicators

AVAILABILITY:

In-house use only

LOCATION:

BUILDING: 490 ROOM: 129

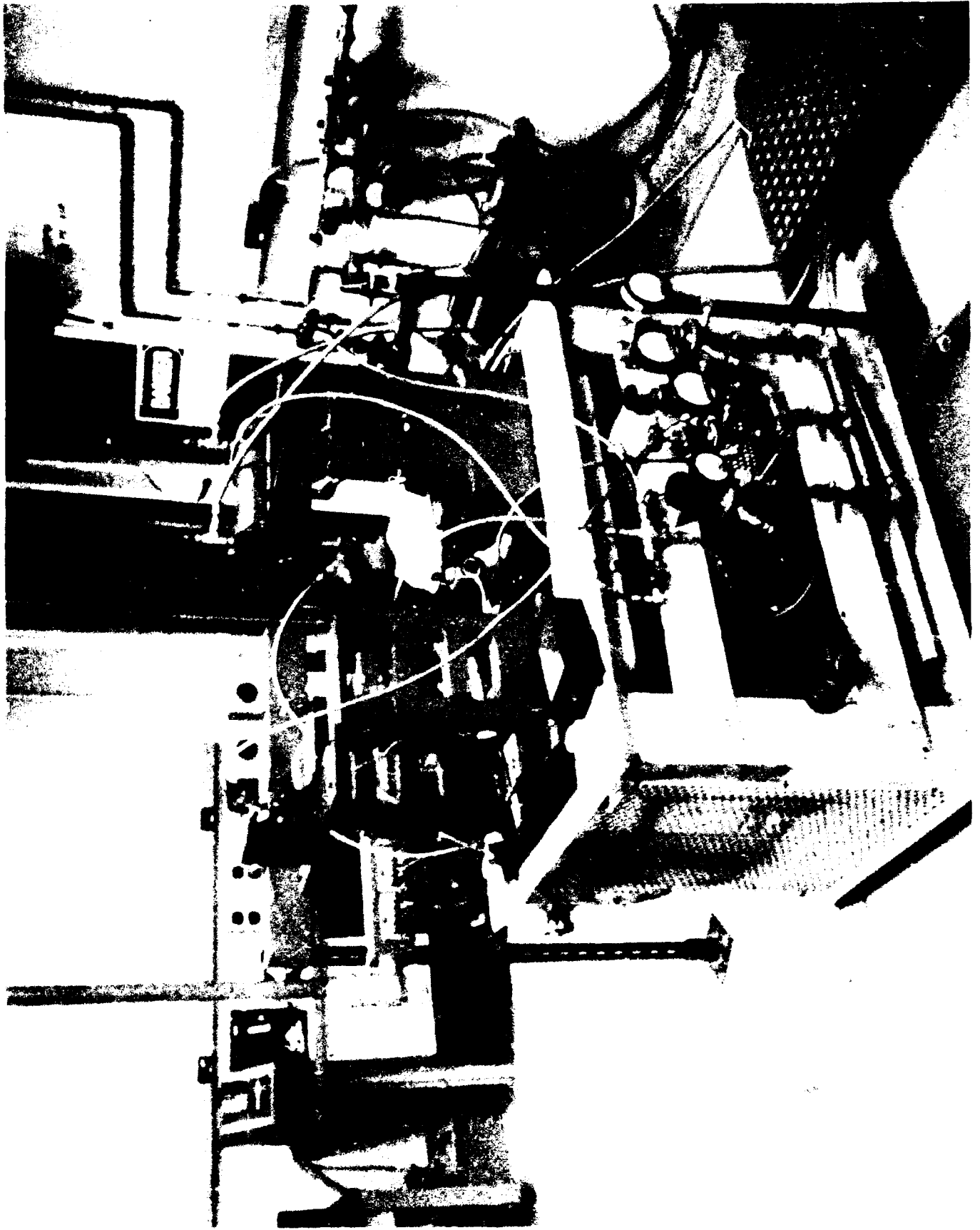
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-1286

DSN 785-1286



High Temperature High Speed Bearing Test Rig

FACILITY TYPE:

Lubricants

PURPOSE:

Evaluate experimental lubricants for turbine engine applications

FACILITY NAME:

J57 Engine Simulator

PRIMARY CAPABILITIES:

Evaluate thermal and oxidative stress, in a simulated engine environment, of candidate high temperature lubricants for qualification to existing military specs

Evaluate experimental oils for advanced turbine engine concepts

SPECIAL/UNIQUE CAPABILITIES:

Simulator constructed utilizing numbers 4-5 bearing/seal compartments of a Dash 59 Series J57 engine

System driven through accessory drive gearbox and heated electrically

Run cycle used is equivalent to full-scale J57 engine test

INSTRUMENTATION:

Fully automated facility; hands free operation

Cycle control and data acquisition computer managed

Data analysis and report printing by computer

AVAILABILITY:

In-house or on-site contractor use only

LOCATION:

BUILDING: 490 ROOM: 131

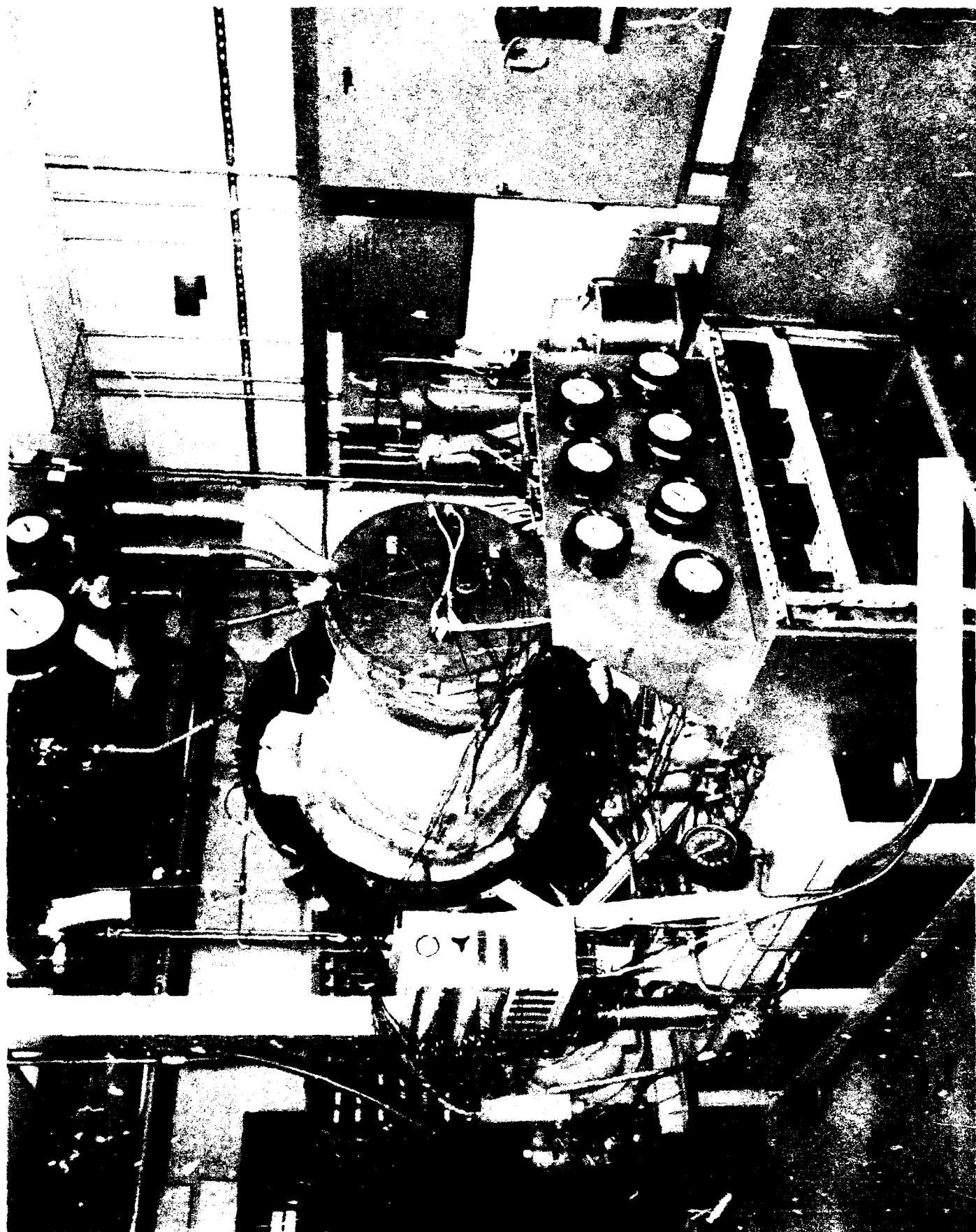
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-7463

DSN 785-7463



FACILITY TYPE:

Lubricants

PURPOSE:

Analyze basic lubricant properties

FACILITY NAME:

Lubricant Analysis Facility

PRIMARY CAPABILITIES:

Test for basic lubricant chemical and physical properties

SPECIAL/UNIQUE CAPABILITIES:

Viscosities may be determined at temperatures as low as -65 degF

INSTRUMENTATION:

Viscometers, pH meters, analytical balances, centrifuge, oil foaming test rig, microfiltration rig

AVAILABILITY:

In-house or on-site contractor use only

LOCATION:

BUILDING: 490 ROOM: 235

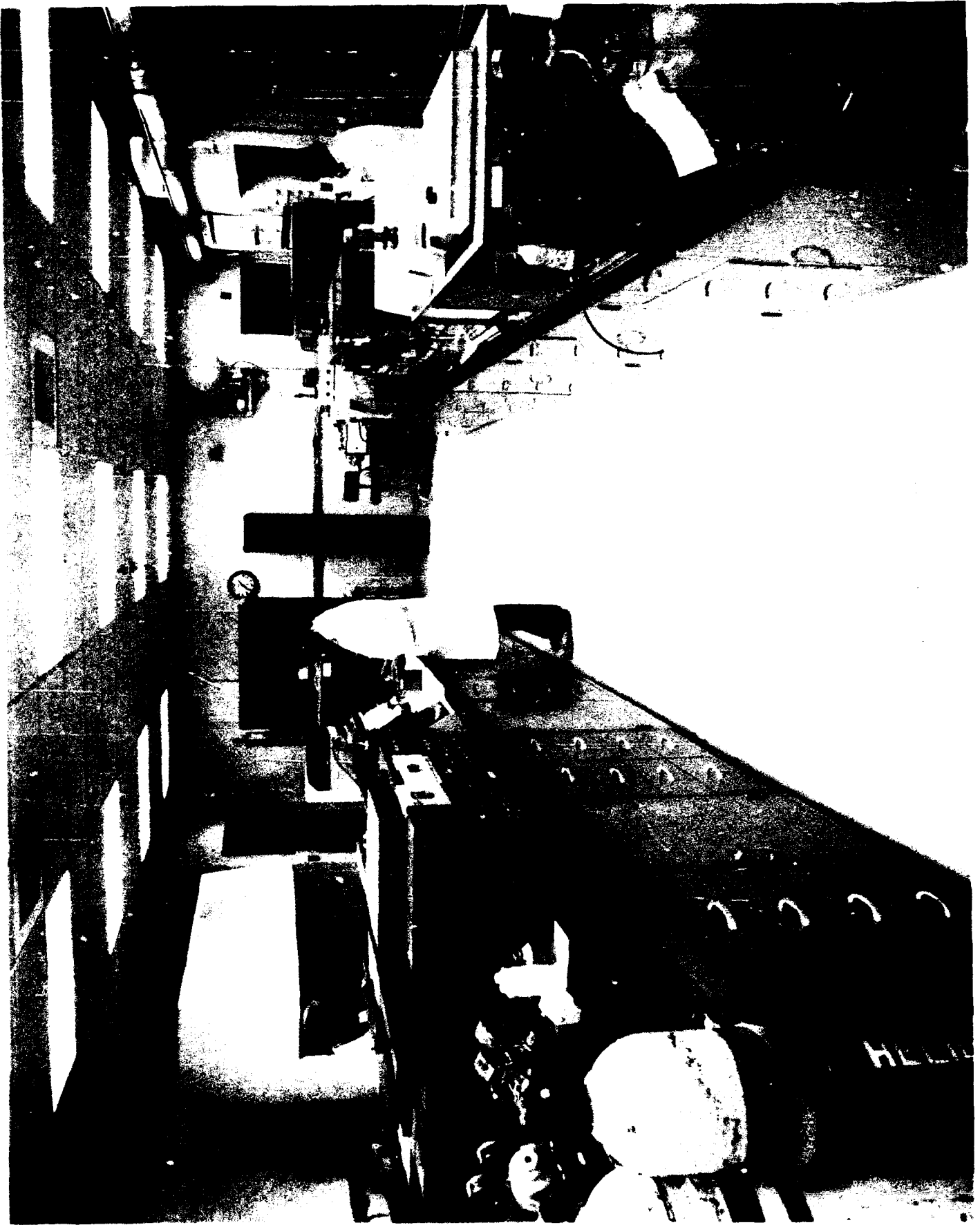
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-4939

DSN 785-4939



FACILITY TYPE:

Lubricants

PURPOSE:

Assess tribological characteristics of both liquid and solid lubricants in a high temperature pin-on-disk apparatus

FACILITY NAME:

Lubricant Friction and Wear Facility

PRIMARY CAPABILITIES:

Test tribological properties of both liquid and solid high temperature lubricants

Provide typical load, speed, and temperature settings of 10 lbs axial, 1500 rpm or reciprocating, and 1000 deg C

SPECIAL/UNIQUE CAPABILITIES:

Computer controlled; real time friction and wear measurements; computer data acquisition; controlled atmosphere

INSTRUMENTATION:

High temperature tribometer

AVAILABILITY:

In-house or on-site contractor only

LOCATION:

BUILDING: 490 ROOM: 232

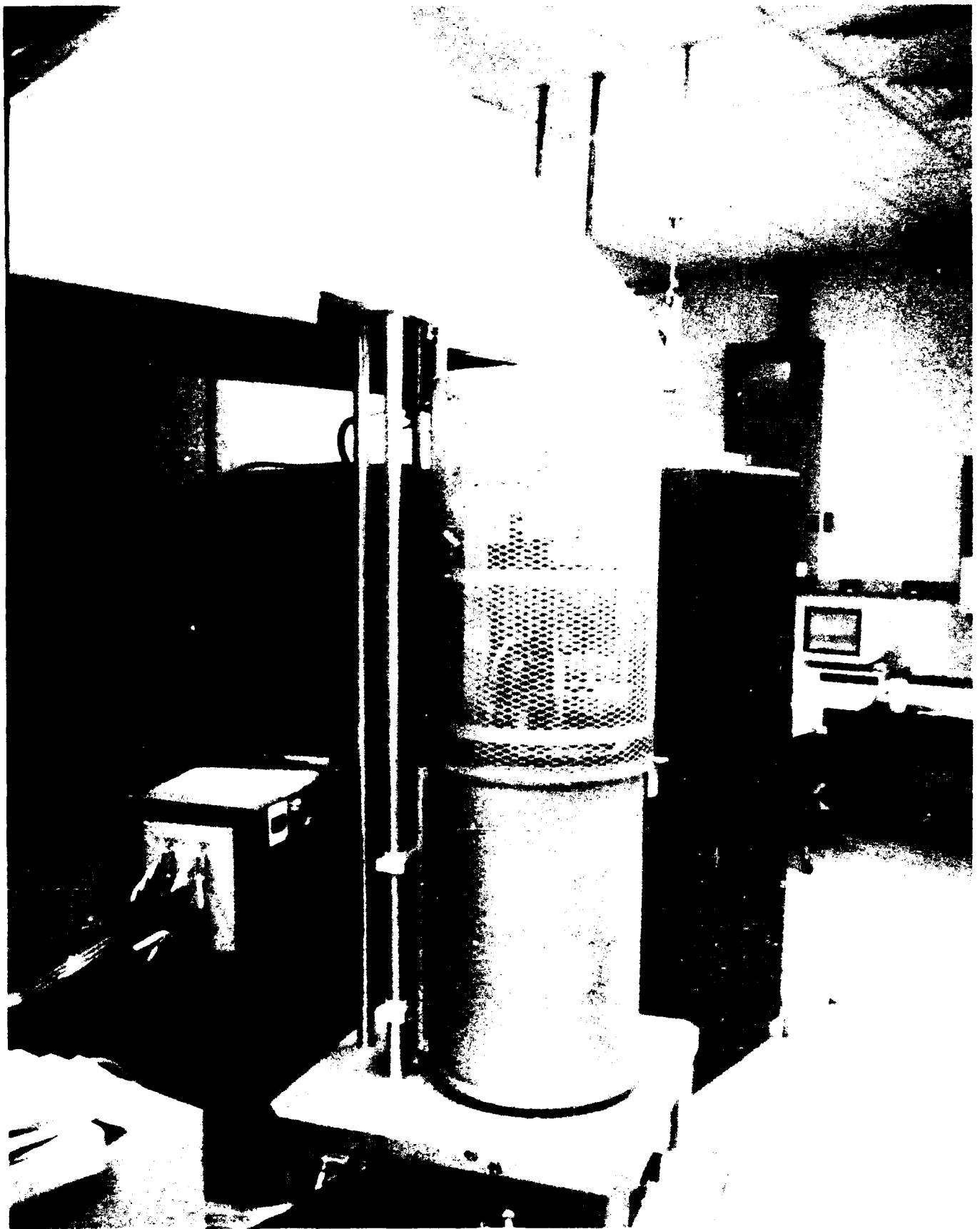
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-4939

DSN 785-4939



Lubricant Friction and Wear Facility

FACILITY TYPE:

Lubricants

PURPOSE:

Assess tribological characteristics of lubricants in rolling and sliding bearing contact

FACILITY NAME:

Lubricant Friction and Wear Testing Facility

PRIMARY CAPABILITIES:

Test liquid lubricant tribological properties

Provide typical load, speed, and temperature settings of 35 lbs, 1200 rpm, and 320 degC for wear testing

SPECIAL/UNIQUE CAPABILITIES:

Computer controlled; data acquisition by computer; instrumentation may be configured to simulate alternate loading conditions

INSTRUMENTATION:

Four-ball wear testers

AVAILABILITY:

In-house or on-site contractor use only

LOCATION:

BUILDING: 490 ROOM: 234

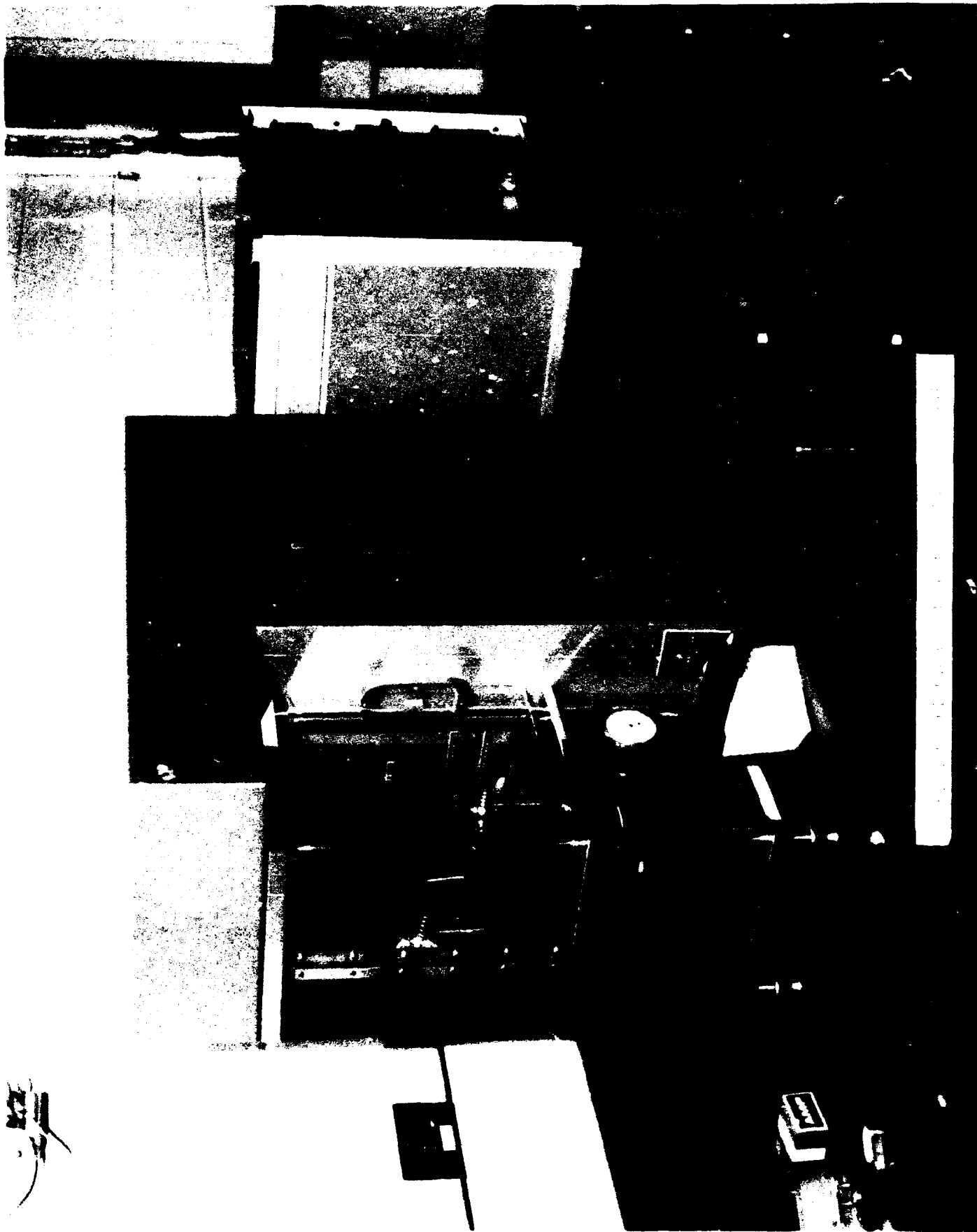
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-4939

DSN 785-4939



FACILITY TYPE:

Lubricants

PURPOSE:

Examine lubricant property changes attributable to severely adverse environments

FACILITY NAME:

Lubricant Stability Analysis Facility

PRIMARY CAPABILITIES:

Expose lubricants to a variety of adverse operating conditions simulating actual engine and more severe environments

SPECIAL/UNIQUE CAPABILITIES:

Assess lubricant stability over wide range of conditions under a variety of extreme conditions

INSTRUMENTATION:

Static coker, oxidation-corrosion rig, micro-carbon residue tester, isothermal oxidation tester

AVAILABILITY:

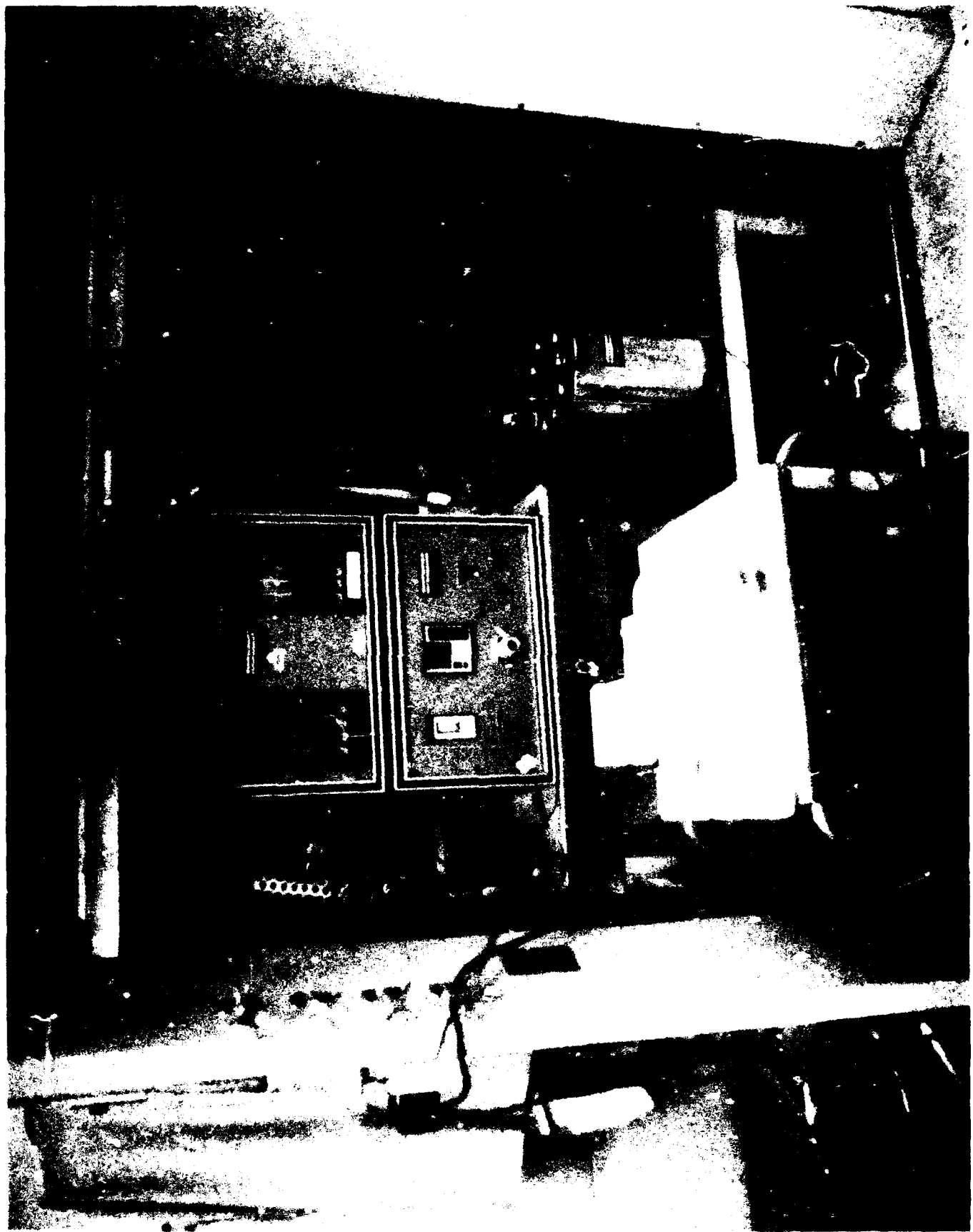
In-house or on-site contractor use only

LOCATION:

BUILDING: 490 ROOM: 227

POINT OF CONTACT:

WL/POSL
WPAFB, OH 45433-6563
(513) 255-4939
DSN 785-4939



Lubricant Stability Analysis Facility

FACILITY TYPE:

Lubricants

PURPOSE:

Visual and surface examination of solid lubricants and engine components

FACILITY NAME:

Microscopy Facility

PRIMARY CAPABILITIES:

High magnification examination and elemental analysis of surfaces

SPECIAL/UNIQUE CAPABILITIES:

Phase contrast; bichromatic and polarized light microscope

INSTRUMENTATION:

Scanning electron microscope with energy dispersive x-ray diffraction elemental detector

Bichromatic and polarizing light microscopes

AVAILABILITY:

In-house or on-site contractor use only

LOCATION:

BUILDING: 490 ROOM: 226

POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-4939

DSN 785-4939



FACILITY TYPE:

Lubricants

PURPOSE:

Evaluation of high temperature lubricants under simulated advanced turbine engine operational environments

FACILITY NAME:

Miniaturized Turbine Engine Lubrication System Simulator Facility

PRIMARY CAPABILITIES:

Test liquid lubricants under simulated turbine engine conditions including bulk oil temperatures to 750 deg C, bearing temperatures to 850 deg C,

(cont) and hot spots to 950 deg C

SPECIAL/UNIQUE CAPABILITIES:

Computer controlled; computer data acquisition; one quart sample size; inerting

INSTRUMENTATION:

High temperature miniaturized turbine engine lubrication system simulator

AVAILABILITY:

In-house or on-site contractor only

LOCATION:

BUILDING: 490 ROOM: 230

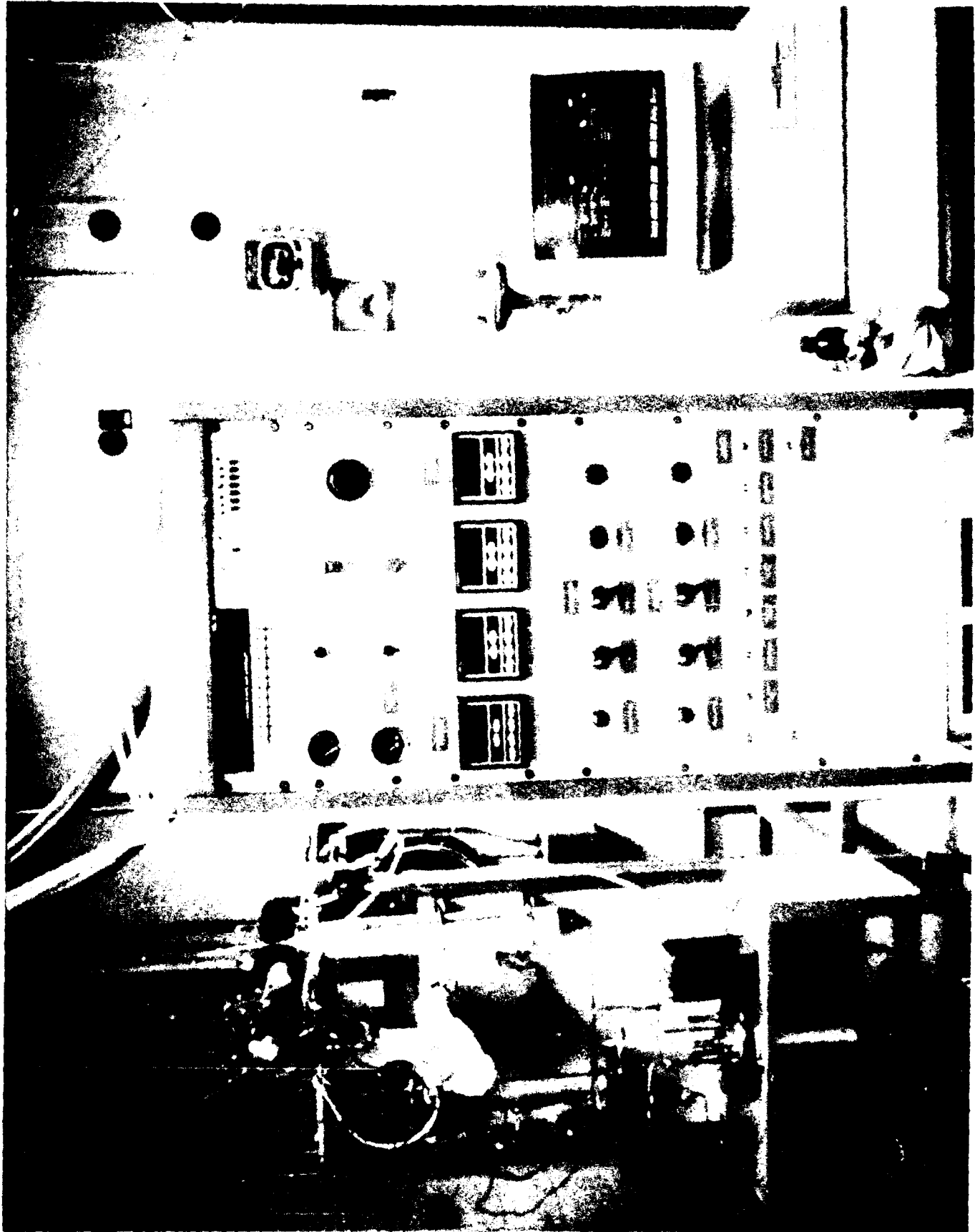
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-4939

DSN 785-4939



Minaturized Turbine Engine Lubrication System Simulator Facility

AD-A258 746

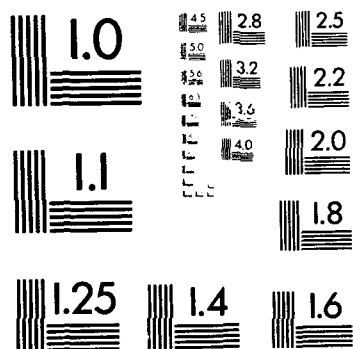
WRIGHT LABORATORY RESEARCH AND DEVELOPMENT FACILITIES
HANDBOOK(U) WRIGHT LAB WRIGHT-PATTERSON AFB OH
M B SKUJINS AUG 92 WL-TR-92-0004 XC-WL/HP

275

UNCLASSIFIED

NL





FACILITY TYPE:

Lubricants

PURPOSE:

Analyses of high temperature, solid lubricants and their thermal and oxidative decomposition products

FACILITY NAME:

Molecular Emission Spectrophotometer

PRIMARY CAPABILITIES:

Detection of different oxidized species on solid lubricants

SPECIAL/UNIQUE CAPABILITIES:

Simultaneous, rapid detection of oxidized species in samples of solid lubricants using a technique on time-resolved molecular emission spectroscopy

INSTRUMENTATION:

Atomic emission/absorption spectrophotometer adapted for molecular analysis

Control computer and printer

AVAILABILITY:

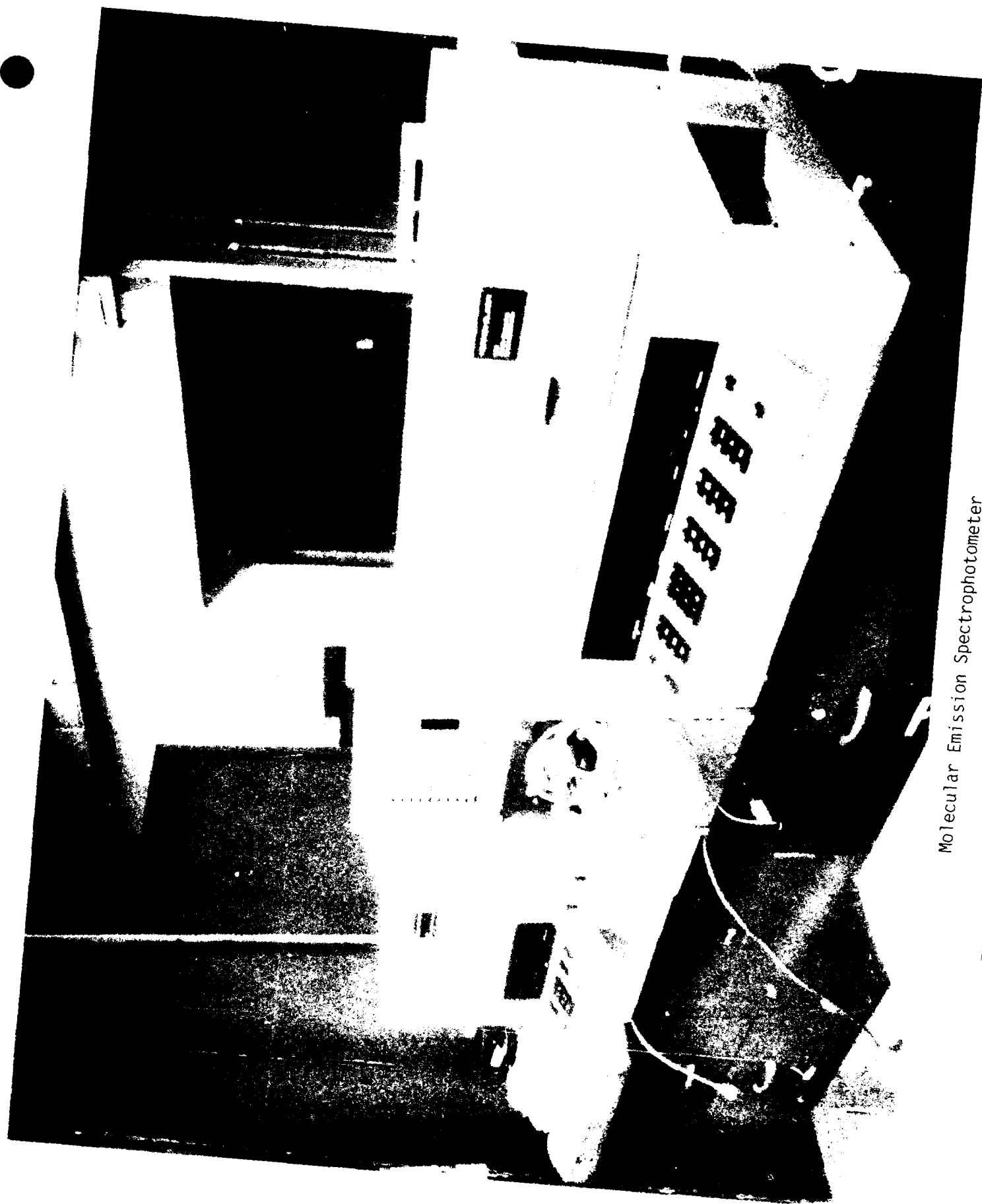
In-house or on-site contractor only

LOCATION:

BUILDING: 490 ROOM: 235

POINT OF CONTACT:

WL/POSL
WPAFB, OH 45433-6563
(513) 255-4939
DSN 785-4939



Molecular Emission Spectrophotometer

FACILITY TYPE:

Lubricants

PURPOSE:

Analyses of high temperature lubricants and their thermal and oxidative decomposition products

FACILITY NAME:

System for Thermal Diagnostic Studies (STDS)

PRIMARY CAPABILITIES:

High temperature (1100 deg C) lubricant decomposition in thermal or oxidative environments

Gas chromatographic separation of decomposition products

Mass spectrometric and Fourier transform infrared spectrophotometric identifications of decomposition products

SPECIAL/UNIQUE CAPABILITIES:

Computer controlled; computer data acquisition; data library searching for compound identifications

INSTRUMENTATION:

Temperature and flow controlled thermal reactor; gas chromatograph

Mass Selective Detector (MDS); Infrared Detector (IRD)

Associated computers, controllers, and printers

AVAILABILITY:

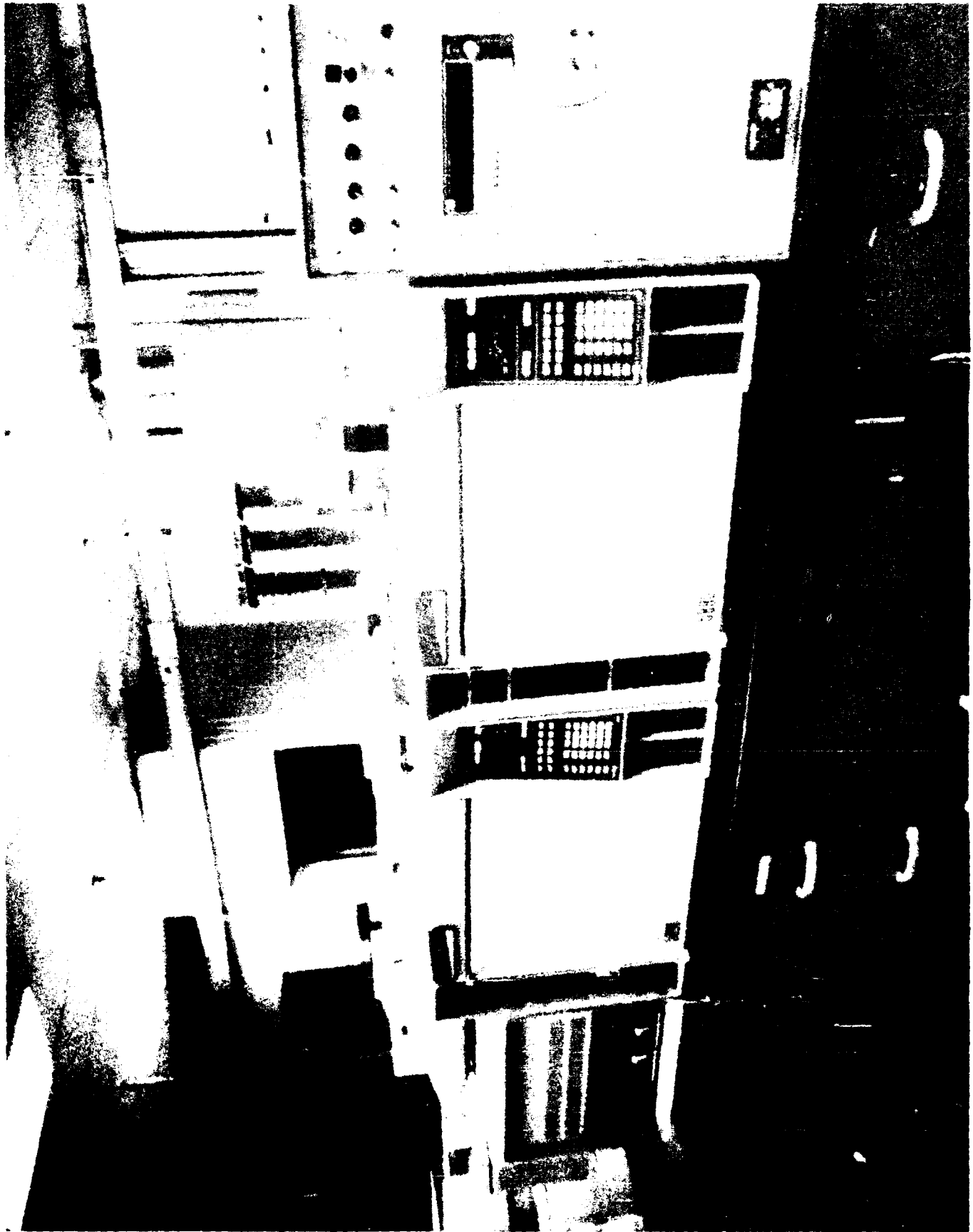
In-house or on-site contractor only

LOCATION:

BUILDING: 490 ROOM: 235

POINT OF CONTACT:

WL/POSL
WPAFB, OH 45433-6563
(513) 255-4939
DSN 785-4939



System for Thermal Diagnostic Studies (STDS)

FACILITY TYPE:

Lubricants

PURPOSE:

Characterize thermal properties of solid and liquid lubricants

FACILITY NAME:

Thermal Analysis Facility

PRIMARY CAPABILITIES:

Characterize energy, dimension and mass changes of lubricants as a function of temperature and time

SPECIAL/UNIQUE CAPABILITIES:

Simultaneous thermal analysis possible

INSTRUMENTATION:

Differential scanning calorimetry, differential thermal analysis, thermogravimetric and thermomechanical analyses, mass analyzer

AVAILABILITY:

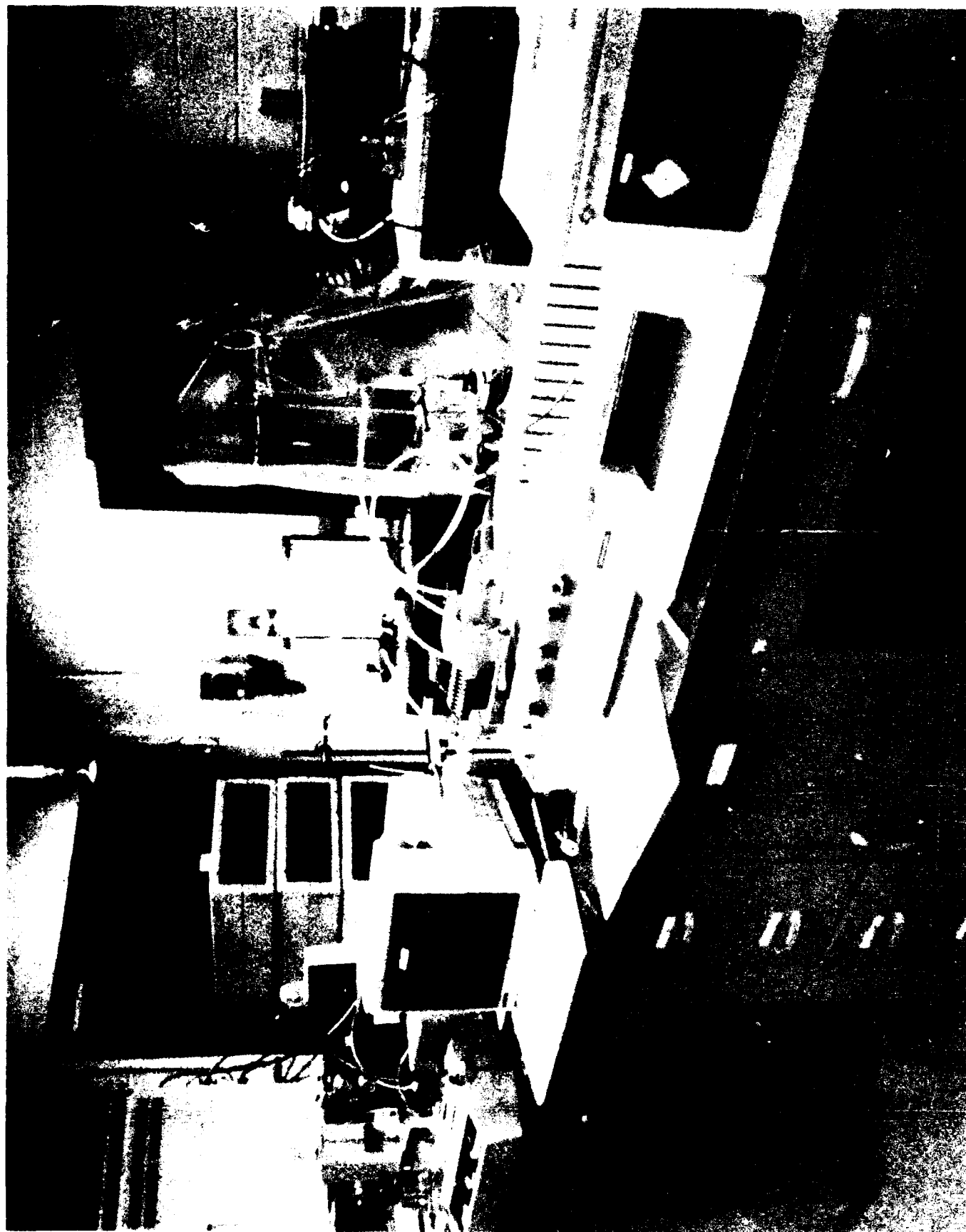
In-house or on-site contractor use only

LOCATION:

BUILDING: 490 ROOM: 231

POINT OF CONTACT:

WL/POSL
WPAFB, OH 45433-4939
(513) 255-4939
DSN 785-4939



Thermal Analysis Facility

FACILITY TYPE:

Lubricants

PURPOSE:

Evaluate final phases of experimental lubricants for turbine engine applications

FACILITY NAME:

T63 Engine Test Stand

PRIMARY CAPABILITIES:

Evaluate candidate lubricants for possible qualification to existing military specifications

Evaluate experimental oils for advanced turbine engine concepts

SPECIAL/UNIQUE CAPABILITIES:

T63-A5A turboshaft engine

Waterbrake type dynamometer to simulate the load (about 350 hp) on the engine

INSTRUMENTATION:

Automated data acquisition system capable of obtaining data from 20 I/C and 5 CR/Al thermocouples

20 pressure transducers, 3 shaft speed tachometers, 5 fuel, oil and water flowmeters

5 vibration pickups, 1 torquemeter

AVAILABILITY:

In-house or on-site contractor use only

LOCATION:

BUILDING: 490 ROOM: 146/7

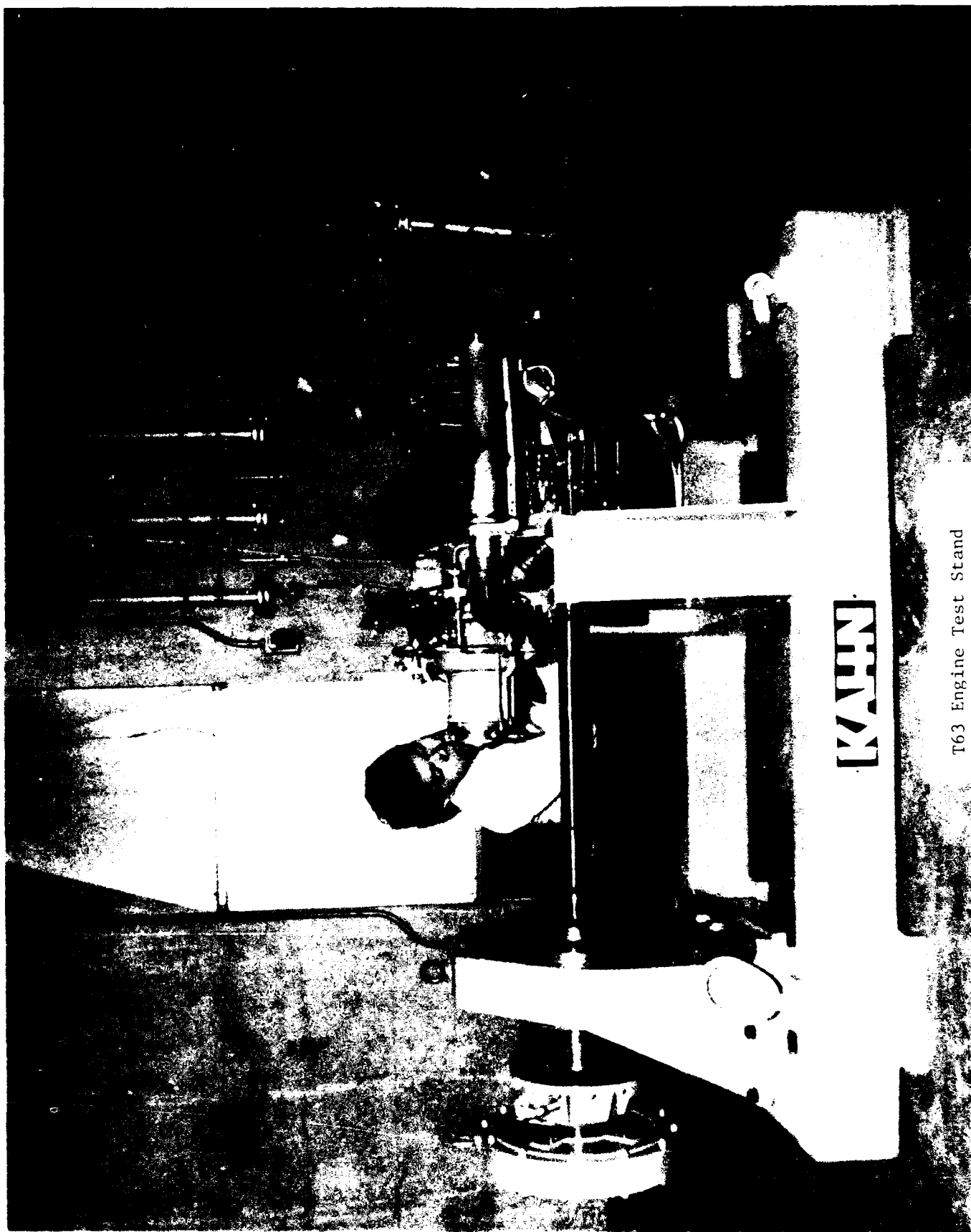
POINT OF CONTACT:

WL/POSL

WPAFB, OH 45433-6563

(513) 255-7477

DSN 785-7477



T63 Engine Test Stand

FACILITY TYPE:

Sea Level Engine Stand

PURPOSE:

Performance, endurance and validation research and testing of aircraft jet engines and other test articles

FACILITY NAME:

D-Bay Sea Level Engine Stand

PRIMARY CAPABILITIES:

Floor mounted, pedestal type, 60,000 lbs thrust test stand

Accepts test articles up to 8'4" diameter, 20' long

Cell air flow capability to 2,300 pounds per second

Fuel system capable of 100,000 pounds per hour flow rate

SPECIAL/UNIQUE CAPABILITIES:**INSTRUMENTATION:**

100 thermocouple channel with ice point reference; 75 pressure taps; 50 undesignated input channels for engine instrumentation

Data acquisition by computer, engine operation in manual mode only

Capability and interface for fully automatic operation exists if control computer is replaced

AVAILABILITY:

Available to US Government agencies and agency sponsored contractors

LOCATION:

BUILDING: 71A ROOM: D-Bay

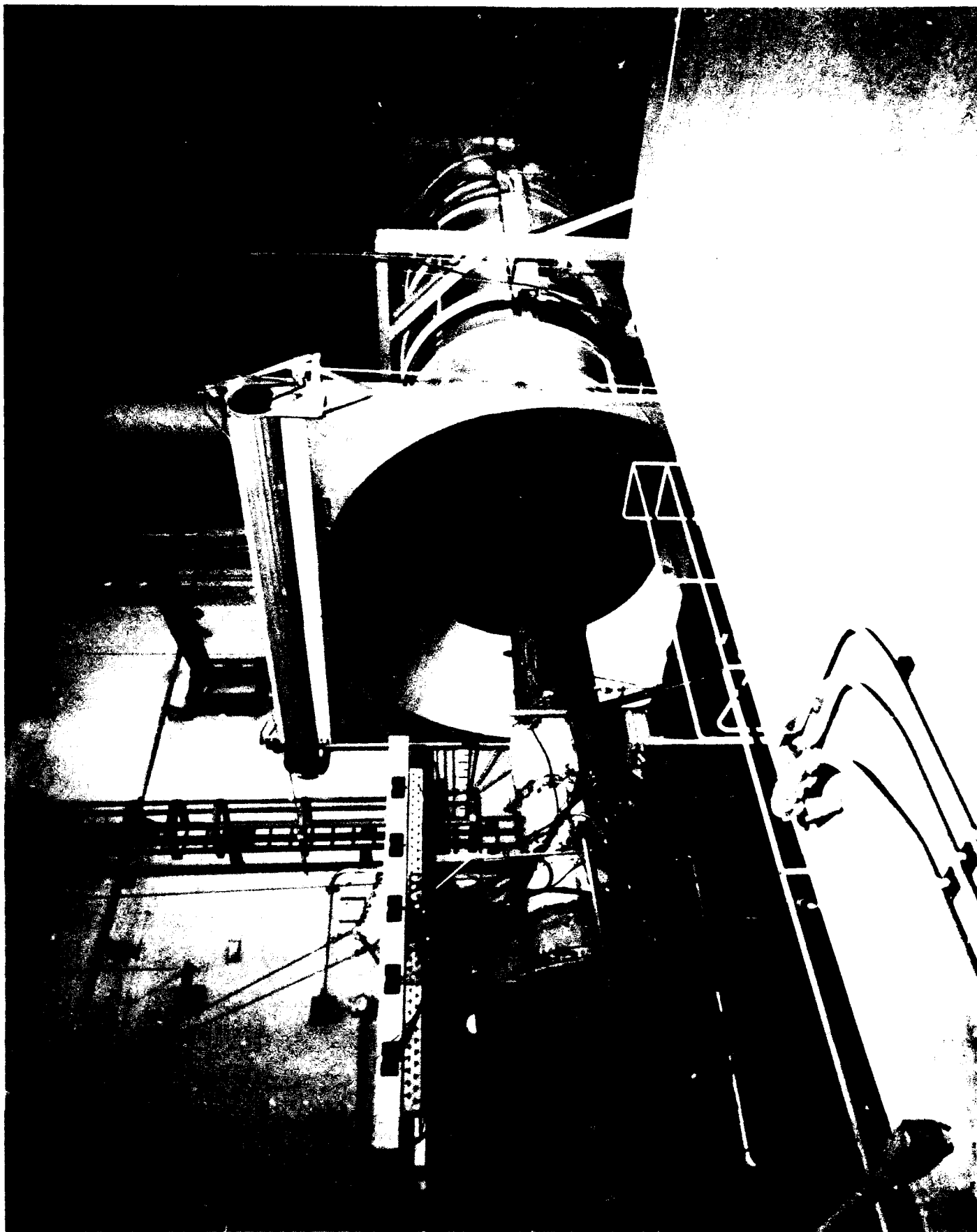
POINT OF CONTACT:

WL/POX

WPAFB, OH 45433-6563

(513) 255-3113

DSN 785-3113



D-Bay Sea Level Engine Stand

FACILITY TYPE:

Turbine Engines

PURPOSE:

Provide analytical and physical research and test capabilities to develop turbine component technology

FACILITY NAME:

Turbine Research Laboratory

PRIMARY CAPABILITIES:

(1) Turbine Aero/Thermal Basic Research Facility focuses attention on turbulence effects on turbine heat transfer and film cooling; rig test cell 21

(2) Advanced Turbine Aerothermal Research Rig (ATARR) for heat transfer and aerodynamic performance measurement and research on full-scale turbines; J-Bay

ATARR will simulate all relevant engine conditions governing turbine operation

ATARR will incorporate unique nonintrusive instrumentation systems to measure surface heat transfer, velocity and temperature within turbine blade passages

SPECIAL/UNIQUE CAPABILITIES:

(1) Basic Research: ability to take aero/thermal data with/without blowing at turbulence levels of 5 to 25% in a 1-D flow field

(2) ATARR: low cost short duration operation, integrated aerodynamic and heat transfer testing in 3-D rotating environment

Location: (1) Building 18C, room 21; (2) J-Bay

INSTRUMENTATION:

(1) Laser: 2 focus velocimeter, 3 component off axis laser doppler velocimeter, 8 channel hot wire anemometer

(2) High frequency on-surface heat flux sensors; temperature and pressure probes

AVAILABILITY:

Primarily in-house research

Limited use by Government personnel and contractors

LOCATION:

BUILDING: ROOM:

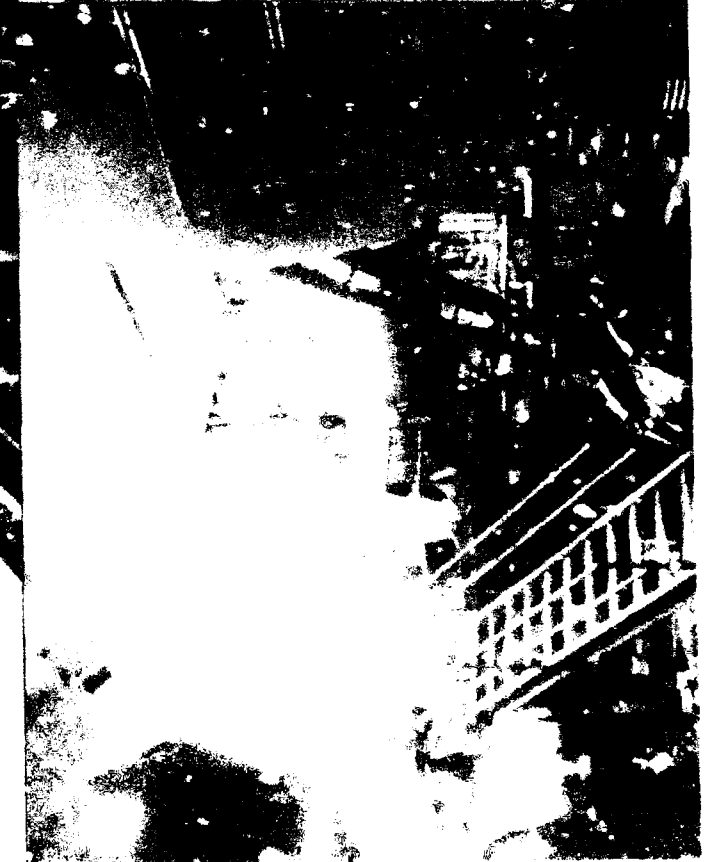
POINT OF CONTACT:

WL/POTC

WPAFB, OH 45433-6563

(513) 255-4830

DSN 785-4830



FACILITY TYPE:

Turbine Engine

PURPOSE:

Research advanced fan and compressor concepts

FACILITY NAME:

Compressor Aerodynamic Research Laboratory

PRIMARY CAPABILITIES:

2000 hp, 6,000 to 21,500 RPM

Air flow 20 to 60 lbs/sec

14 to 19 inch rotor tip diameter

6 to 15 psia inlet total pressure

SPECIAL/UNIQUE CAPABILITIES:

Three unique compressor test vehicles for advanced research in single and multistage compressor aerodynamic phenomena

INSTRUMENTATION:

160 channels steady state pressure measurement, 100 channels steady state temperature measurement

12 channels high frequency unsteady pressure, 10 channels dynamic strain, rotating components

10 channels dynamic strain, stationary components, 8 channels rotor tip clearance measurement

AVAILABILITY:

Supports AFOSR 6.1 programs

LOCATION:

BUILDING: 450 ROOM: C012

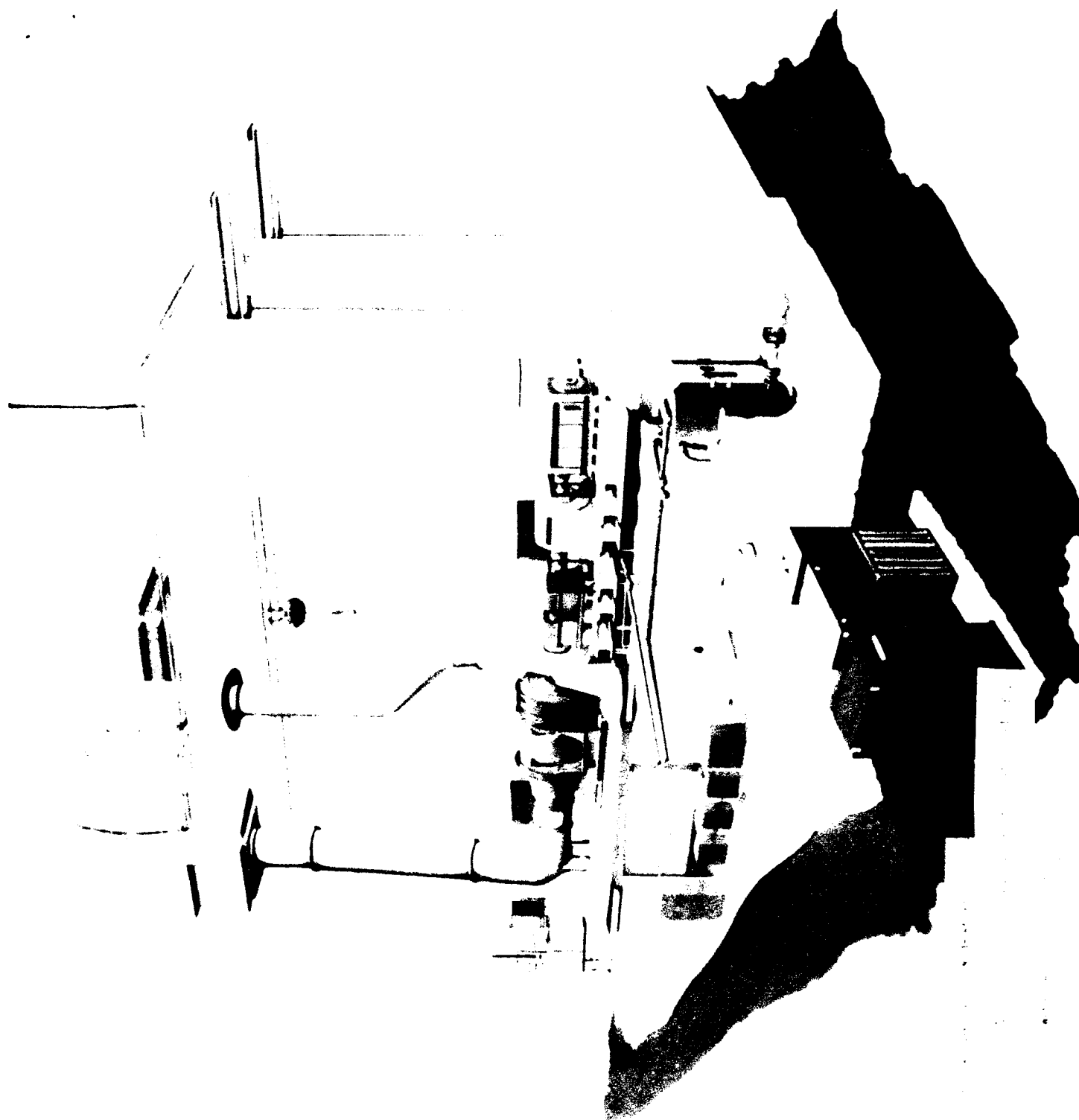
POINT OF CONTACT:

WL/POTX

WPAFB, OH 45433-6563

(513) 255-7163

DSN 785-7163



FACILITY TYPE:

Turbine Engine

PURPOSE:

To conduct exploratory and advanced development tests and evaluations of full-scale, multi-stage, and single shaft fans and compressors

FACILITY NAME:

Compressor Research Facility (CRF)

PRIMARY CAPABILITIES:

Speed/power: 3,000 to 16,000 rpm at 30,000 hp; 16,000 to 30,000 rpm at 15,000hp

Acceleration rate: 10%/second (facility speed); Shop area : 13,325 square feet

Inlet conditions: pressure, 2 psia-ambient; flow (actual), 15-500lbm/sec; temperature, ambient

Discharge conditions: Flow (maximum corrected) in core 500 lbm/sec, in fan discharge system (FDS) 100 lbm/sec; temperature in core 1,490 deg F, in FDS 400 deg F

SPECIAL/UNIQUE CAPABILITIES:

Steady-state and transient phenomena on full-size test articles under operating conditions similar to actual flight profiles

Dual discharge, laser anemometry, on-line graphics, automatic strain gage monitoring, near real-time analog data reduction

Facility automated and computer controlled

INSTRUMENTATION:

712 channels, steady-state digital data

164 channels analog data (frequency response up to 100 KHz)

Laser transit and laser Doppler flow measurement

AVAILABILITY:

Available for both military and commercial fan/compressor testing

Located in buildings 20, 20A, 21, 71B and 71D

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/POTX
WPAFB, OH 45433-6563
(513) 255-6802
DSN 785-6325

COMPRESSOR RESEARCH FACILITY



FACILITY TYPE:

Turbine Engine

PURPOSE:

Support compressor research test programs

FACILITY NAME:

Compressor Research Facility Component Test and
Structures Laboratory

PRIMARY CAPABILITIES:

Flow facility for calibration of inlets and probes

Low speed compression system studies for flow
measurement development

Holographic interferometry on compressor blades, vanes,
and instrumentation probes

SPECIAL/UNIQUE CAPABILITIES:

Development of both laser transit and laser Doppler
anemometry systems

Spectral analysis through thermal emissions (SPATE)

INSTRUMENTATION:

Argon laser, optical devices

Analog and digital data acquisition

AVAILABILITY:

Supports compressor tests and other Air Force agencies

LOCATION:

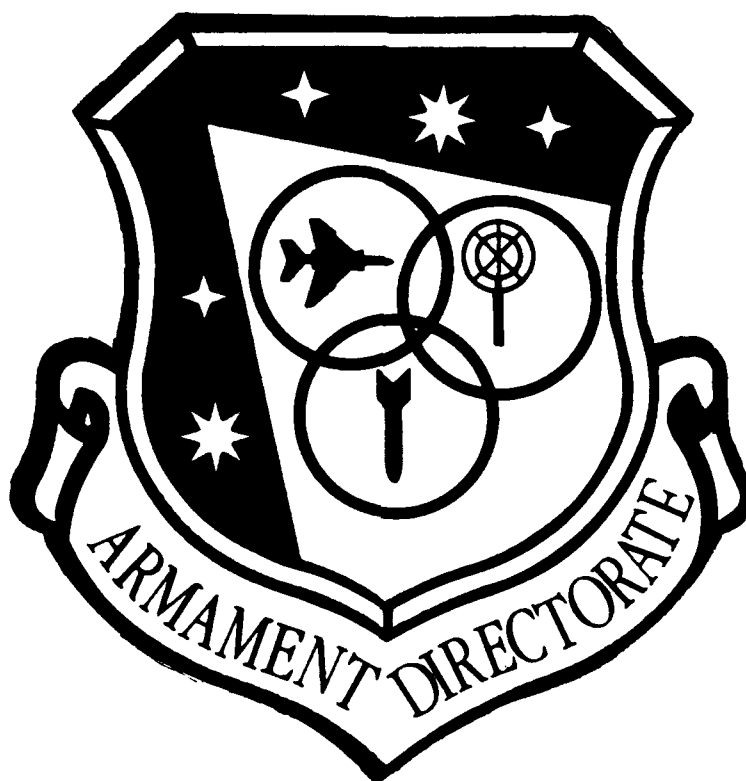
BUILDING: 18D ROOM: 24

POINT OF CONTACT:

WL/POTX
WPAFB, OH 45433
(513) 255-8210
DSN 785-8210



Compressor Research Facility
Component Test and Structures Laboratory



FACILITY TYPE:

Aeromechanics

PURPOSE:

Provide a launch and flight technology tool to support a wide range of munition program requirements

FACILITY NAME:

Aeroballistics Research Facility (ARF)

PRIMARY CAPABILITIES:

Unit of the Free-Flight Test Facilities

Enclosed, instrumented concrete structure designed for studying free-flight characteristics of projectiles and missile configurations

Launcher room, blast chamber, instrumented range, model measurement room, and facility operations room

SPECIAL/UNIQUE CAPABILITIES:

Test range: instrumented 207 m, 3.66 m square cross section for first 69 m; 4.88 m square cross section for remaining length

Facility is atmospheric test range controlled to 22 +/- 1 deg Centigrade and less than 50% relative humidity

Launch capability: powder guns, compressed gas launchers, two stage light gas gun

INSTRUMENTATION:

One 20 nanosecond pulsed laser photographic station; one laser holographic station

Optical instrumentation systems; 50 dual-plane reflective-screen spark shadowgraph systems

Pulsed x-ray shadowgraph system; CW microwave radar system; conventional high speed motion picture camera systems

AVAILABILITY:

Available to U.S. Government agencies and DOD contractors

LOCATION:

BUILDING: 423 ROOM:

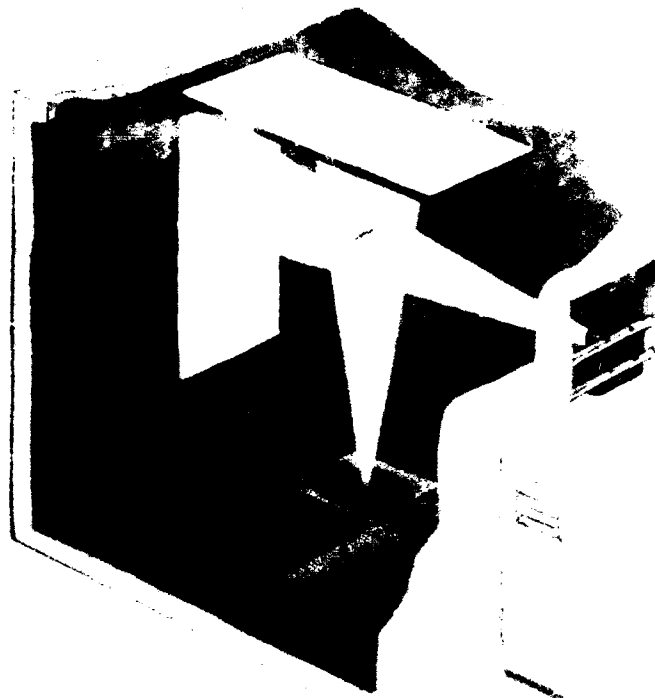
POINT OF CONTACT:

WL/MNAA

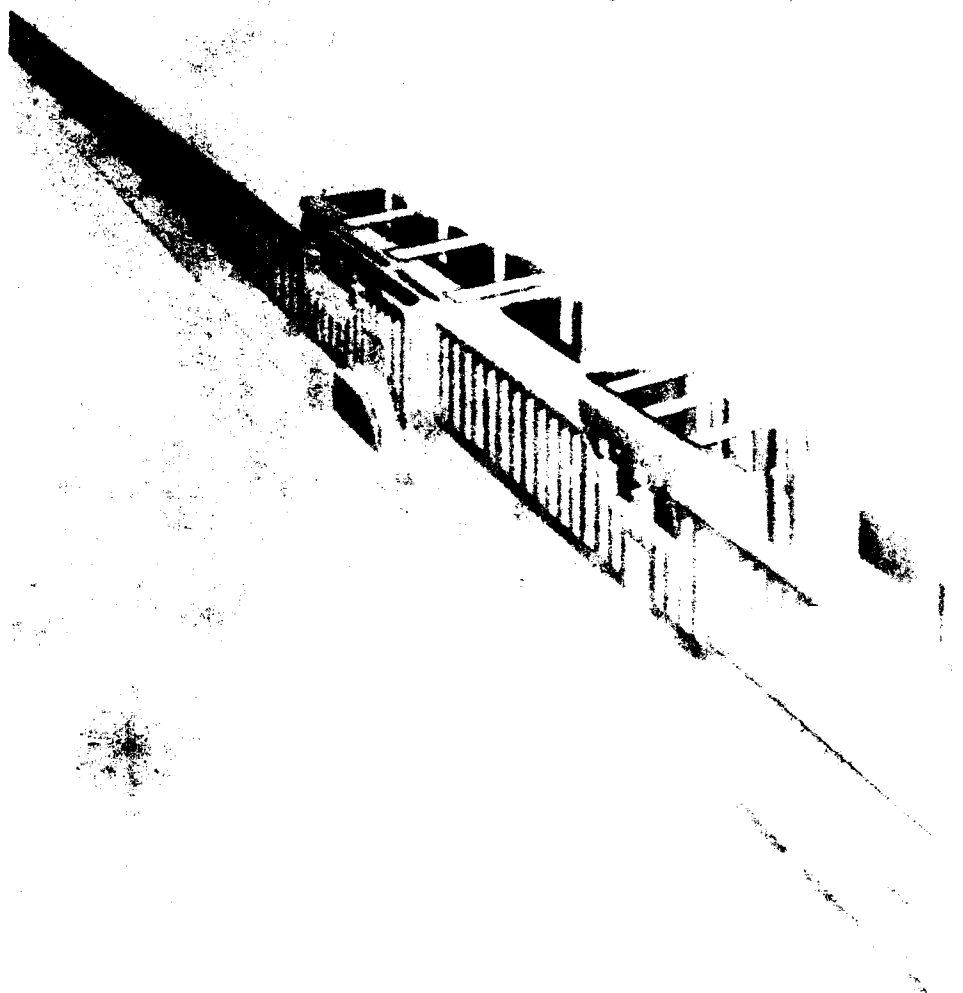
EGLIN AFB, FL 32542-5434

(904) 882-4085

DSN 872-4085



Orthogonal Shadowgraph Station



FACILITY TYPE:

Aeromechanics

PURPOSE:

Provide a launch and flight technology tool to support a wide range of munition program requirements

FACILITY NAME:

Ballistics Experimentation Facility (BEF)

PRIMARY CAPABILITIES:

Unit of the Free Flight Test Facilities

0.25 by 1.5 mile outdoor test range with capability to mount a wide variety of specialized launchers and target structures

Initial development & launch/flight verification of non-standard launch techniques and models scheduled for test support in the Aeroballistics Research Facility

Studies of munition free-flight and impact phenomena relative to stability and/or terminal impact effectiveness

SPECIAL/UNIQUE CAPABILITIES:

Capability to determine model position, velocity, orientation, spin rate, and penetration characteristics

Launch capabilities: powder guns, compressed gas launchers, two stage light gas gun

Tests conducted at subsonic, transonic, supersonic, and hypersonic Mach numbers (up to Mach 10)

INSTRUMENTATION:

High speed solid state cameras, x-ray units, and doppler radar

AVAILABILITY:

Available to U.S. Government agencies and DOD contractors

LOCATION:

BUILDING: 419 ROOM:

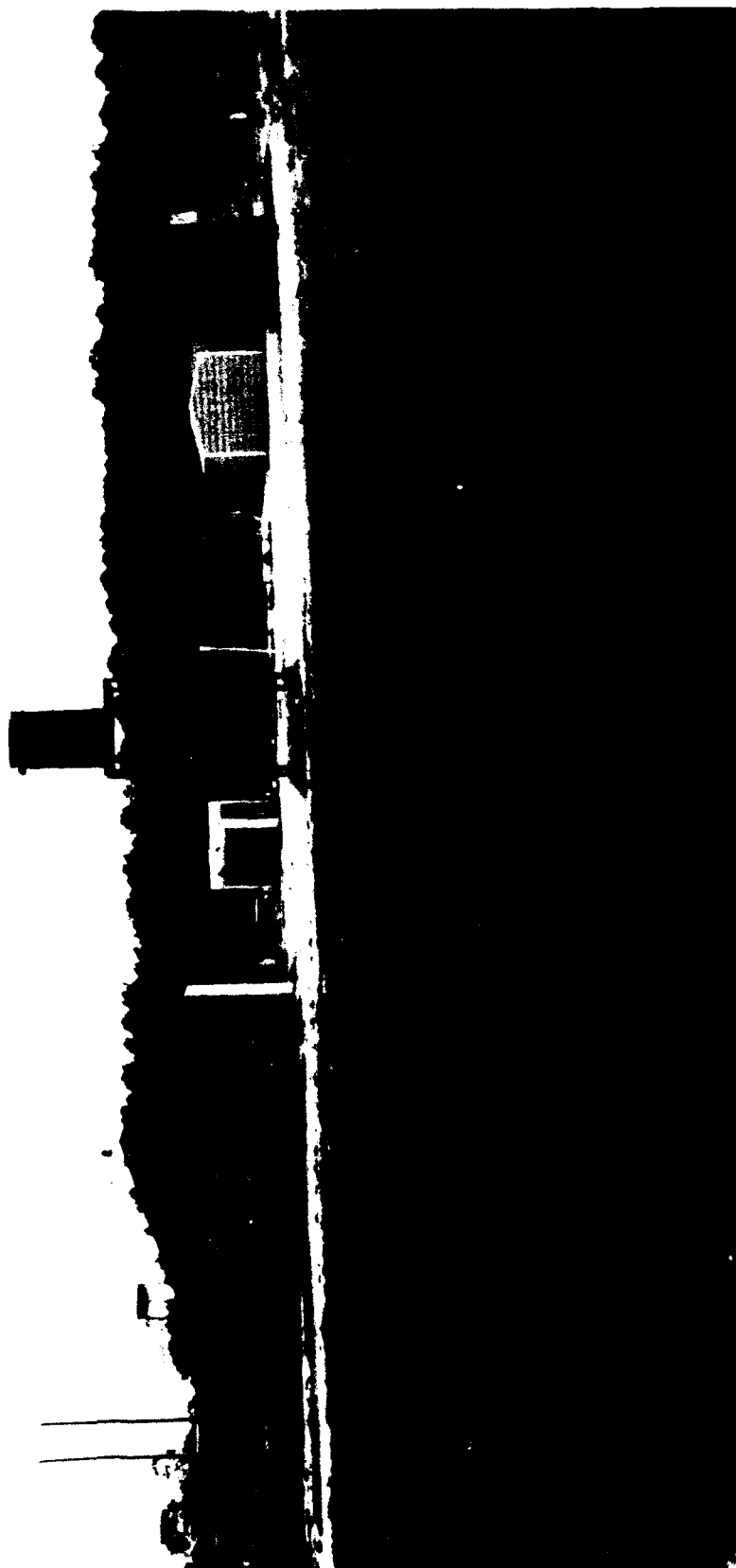
POINT OF CONTACT:

WL/MNAA

EGLIN AFB, FL 32542-5434

(904) 882-5705

DSN 872-5705



Ballistics Experimentation Facility (BEF)

FACILITY TYPE:

Aeromechanics

PURPOSE:

Develop and validate CFD techniques and analyses for weapon carriage/separation phenomenon

FACILITY NAME:

Computational Fluid Dynamics (CFD) Facility

PRIMARY CAPABILITIES:

Develop and validate CFD techniques for design of advanced weapon airframes and analysis of weapon carriage/separation aerodynamic phenomenon

Numerical grid codes and multiblock algorithms have been developed and released to industry for use on complex configurations

SPECIAL/UNIQUE CAPABILITIES:

Capable of providing aerodynamic loads for externally carried weapons on an F-16 aircraft. Data can be used for capability analysis

INSTRUMENTATION:

Silicon Graphics 320 VGX high speed 3-D color graphics workstation and numerous personal IRIS workstations

High speed connection to Eglin's CRAY-YMP 2/128 supercomputer

AVAILABILITY:

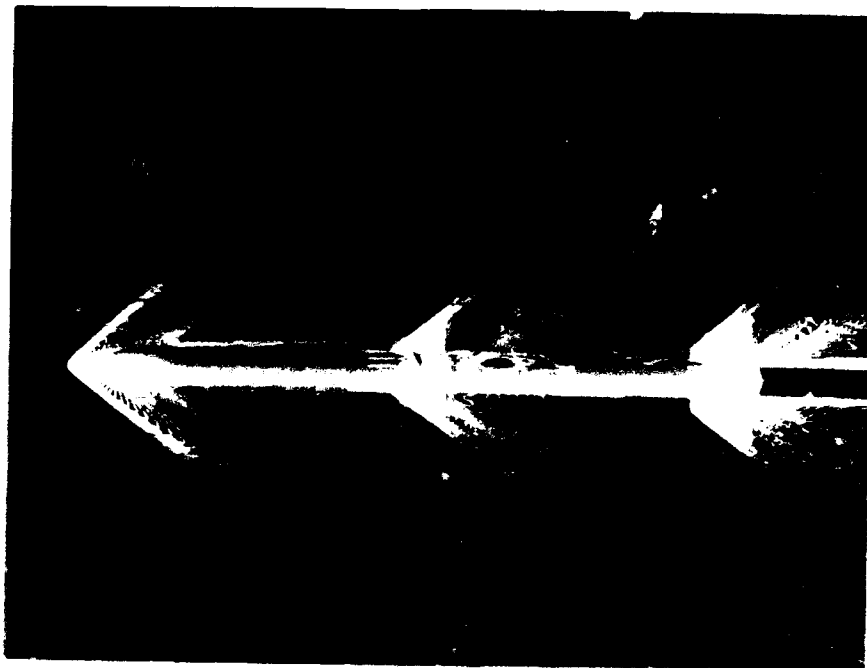
Primarily in-house research. Limited DOD Agencies and Contractors

LOCATION:

BUILDING: 419 ROOM: n/a

POINT OF CONTACT:

WL/MNAA
EGLIN AFB, FL 32542-5434
(904) 882-3124
DSN 872-3124



Computational Fluid Dynamics (CDF) Facility

FACILITY TYPE:

Aeromechanics

PURPOSE:

Provide an integrated launcher and propellant technology development tool to support a wide range of munition program requirements

FACILITY NAME:

Interior Ballistics and Impact Facility

PRIMARY CAPABILITIES:

Fully enclosed firing tunnel: gun room, test control room, data acquisition room, static test room, loading room, conditioning room

Propellant Combustion Laboratory: provides an integrated launcher and propellant technology development tool to support wide range of munition systems programs

Full spectrum of interior ballistics tests available

Launcher hardware: provide test data for ammunition sizes ranging from 0.50 caliber to 30 mm

SPECIAL/UNIQUE CAPABILITIES:

Propellant and projectile charging

Capability for thermal conditioning of projectiles to be tested; two ovens and two refrigerators

INSTRUMENTATION:

Rugged high-dynamic range measurement transducers and high speed recording equipment

AVAILABILITY:

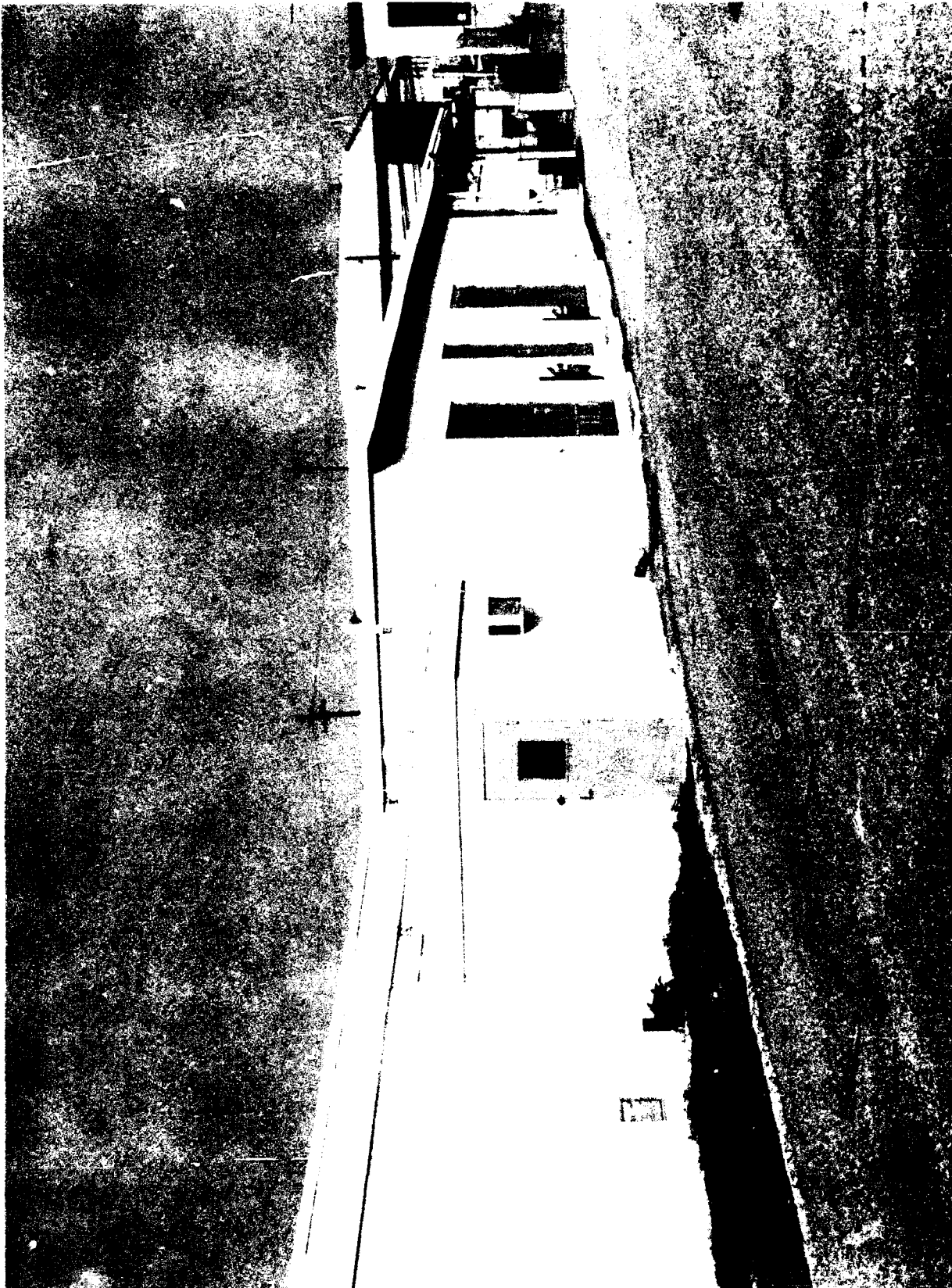
Available to U.S. Government Agencies and DOD contractors

LOCATION:

BUILDING: 415 ROOM:

POINT OF CONTACT:

WL/MNAA
EGLIN AFB, FL 32542-5434
(904) 882-4085
DSN 872-4085



Interior Ballistics and Impact Facility

FACILITY TYPE:

Weapon Flight Mechanics (Aeromechanics)

PURPOSE:

Test and evaluate developing tactical weapons guidance and control technology

FACILITY NAME:

Inertial Navigation Facility

PRIMARY CAPABILITIES:

Test and evaluate tactical inertial navigation hardware and design and evaluate guidance and control software

Develop custom software required to evaluate the variety of inertial sensors and systems developed by defense contractors

Characterize guidance systems and related equipment under development

SPECIAL/UNIQUE CAPABILITIES:

Testing of developmental sensors and systems only

INSTRUMENTATION:

Contraves Model 57A Programmable Indexing Head; Model 30H Control Module

Acutronic Precision 130-80 rate table with environmental chamber

Mobile testbed utilizing Magnavox MX4400 GPS receiver, Honeywell H423 INS, developmental navigation software and in-house developed software

AVAILABILITY:

In-house research and development

LOCATION:

BUILDING: 13 ROOM: 330

POINT OF CONTACT:

WL/MNAG

EGLIN AFB, FL 32542-5434

(904) 882-5489

DSN 872-5489



Inertial Navigation Facility

FACILITY TYPE:

Aeromechanics

PURPOSE:

Static ejection testing

FACILITY NAME:

Carriage and Release Test Facility (CART)

PRIMARY CAPABILITIES:

Measure ejector mechanism performance parameters and operating characteristics with various store configurations

Use ejection test stand as universal test fixture for ejector mechanisms, bomb rack units, pylons, and multiple ejector racks

Representative generic stores of 500 lb through 2000 lb weight classes available for test purposes

Test tensile strength of suspension lugs and other components

SPECIAL/UNIQUE CAPABILITIES:

Data available in real time

INSTRUMENTATION:

Transducers to measure ejection and reaction forces, gas and fluid pressures, and displacement/velocity/acceleration of stores

Tinius Olsen "Super L" Universal Testing machine with 400,000 lb load limit for tensile testing

AVAILABILITY:

Available to DOD organizations - test conducted by facility personnel

LOCATION:

BUILDING: 614 ROOM: 332

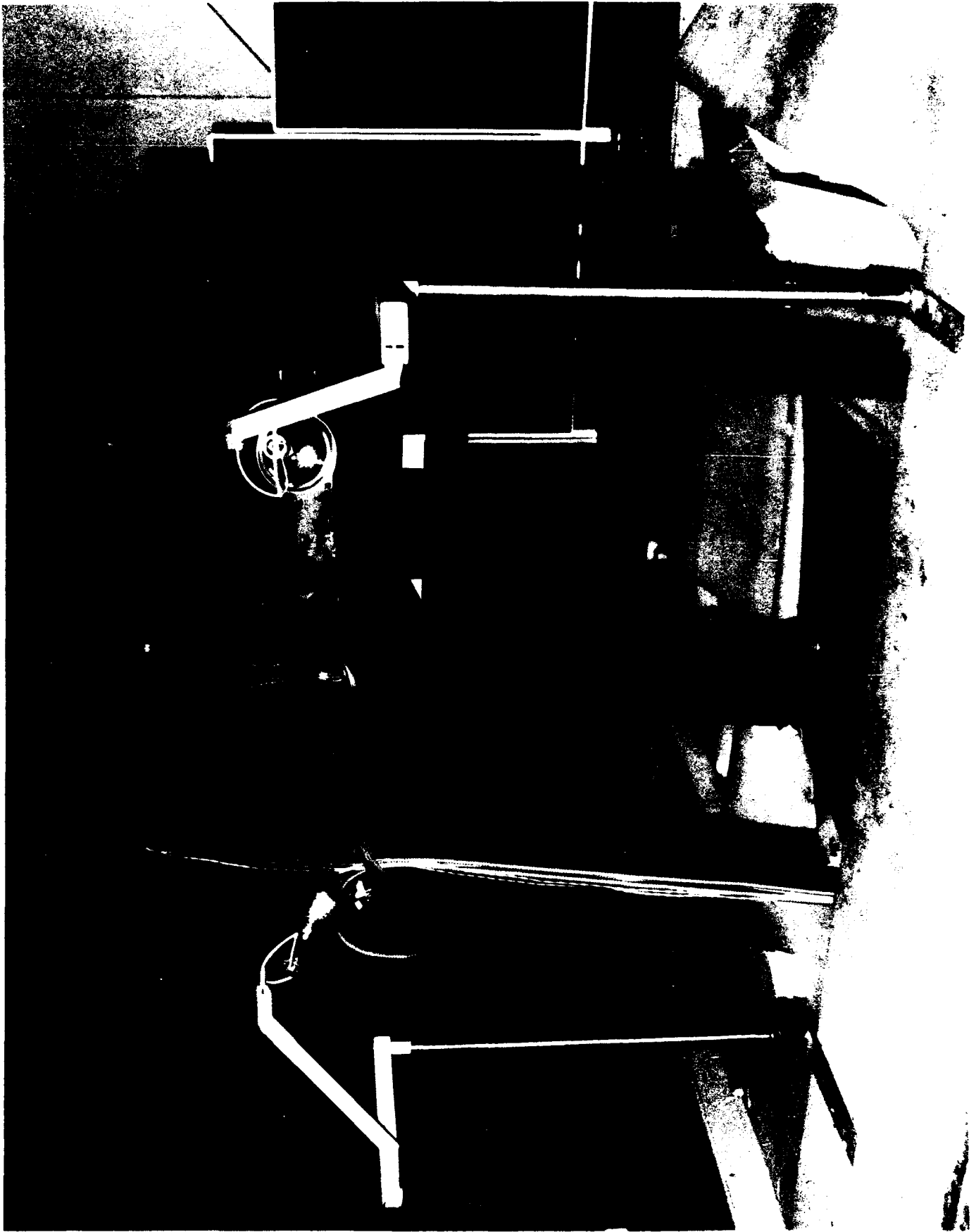
POINT OF CONTACT:

WL/MNAV

EGLIN AFB, FL 32542-5434

(904) 882-8876

DSN 872-8876



Carriage and Release Test Facility (CART)

FACILITY TYPE:

Weapon Guidance Development and Simulation

PURPOSE:

Provide multi-user, infrared, visual, radar and millimeter wave computing facility for guided weapons seeker development

FACILITY NAME:

Advanced Guidance Research Facility

PRIMARY CAPABILITIES:

Develop signal processing software for guided weapons through computer simulation, validate contractor developed simulation and seeker software

Analyze infrared, visual, radar and millimeter wave image data

SPECIAL/UNIQUE CAPABILITIES:

Specialized image processing languages and image array processors, signal processing environments and software tools

Image digitizers, cameras and video equipment

INSTRUMENTATION:

VAX 8650 and 6410 computers, Tektronix 4129 workstation, Numerix array processor, Gould PI8500 image processor with 9 color workstations

AT compatible PC computers, VCR video workstation, cameras, and film recorders; Aptec IOC-24 intelligent data bus, 16 Gigabytes disk storage, 9 track tape drives

FORTRAN, Lisp, Ada, C, Basic, and Pascal languages; LIPS, CAPS, VADS, IPDS image processing languages; IEEE, IMSL, CALC math packages

AVAILABILITY:

Primarily in-house research

Limited to some US Government agencies and contractors

LOCATION:

BUILDING: 13A ROOM: 485-6

POINT OF CONTACT:

WL/MNGI

EGLIN AFB, FL 32542-5434

(904) 882-3338

DSN 872-3338



Image Processing Lab



Radar Signal Processing Lab

Advanced Guidance Research Facility

FACILITY TYPE:

Instrumentation / Guidance

PURPOSE:

Develop advanced instrumentation technologies as applied to armament development; conduct brassboard development & proto-type testing of missile guidance systems

FACILITY NAME:

Instrumentation Technology Research Facility

PRIMARY CAPABILITIES:

Develop, design, fabricate, and conduct experimental testing of instrumentation systems with ordnance weapon release, captive carry and adjunct systems

Evaluate performance of electro-optical tactical missile guidance systems

Verify and test seeker performance, evaluate sensor technologies relating to focal plane arrays, holographic matched filtering, liquid crystal light valves, etc

Conduct high speed sensor research using fiber optics, piezoelectric piezoresistive and other materials; develop video techniques for instrumentation

SPECIAL/UNIQUE CAPABILITIES:

Assist in development of specialized sensors used to obtain parametric measurements; evaluate optical sensing devices to measure minute transient moments

Design nonintrusive instrumentation systems; measure spoil mass using holographic technologies

Advances the use of high speed, high definition video systems for instrumentation

INSTRUMENTATION:

Lasers (HeNe, ND:YAG, Argon, Ruby, CO2, diode), laser Doppler velocimeter, optical laboratory, fiber optic OTDR,

Polarimetric optical computer, black bodies, laser range, electronic laboratory, video research laboratory and general purpose test equipment

AVAILABILITY:

Primarily in-house research and on-site contractor use

LOCATION:

BUILDING: 13 ROOM: 284-6

POINT OF CONTACT:

WL/MNGI
EGLIN AFB, FL 32542-3254
(904) 882-4043 124
DSN 872-4043



Instrumentation Technology Research Facility

FACILITY TYPE:

Optical and Digital Seeker Processing

PURPOSE:

Design, develop, and evaluate optical and digital processing technology; develop a standard math morphology for image processing; develop seeker algorithms

FACILITY NAME:

Electro-Optical Research Facility

PRIMARY CAPABILITIES:

Main Lab: (1232 ft²) Vibration isolated optics benches and computer workstations, Laser Polarimeter

Make measurements of the Kerr and Faraday constants of infrared materials

SPECIAL/UNIQUE CAPABILITIES:

Only known achromatic infrared laser polarimeter; computer driven spatial light modulator for evaluating binary-phase-only-spatial filters

Optical/digital integration for image processing capability

INSTRUMENTATION:

Photometers, laser beam cross section analyzer, high speed oscilloscopes, CO₂, CO and solid state lasers, long and mid wavelength IR detectors

Spatial light modulators integrated with high speed computers, Sun workstation

AVAILABILITY:

Primarily for in-house use

Available for use by other DOD agencies and Government contractors (limited)

LOCATION:

BUILDING: 13A ROOM: 280

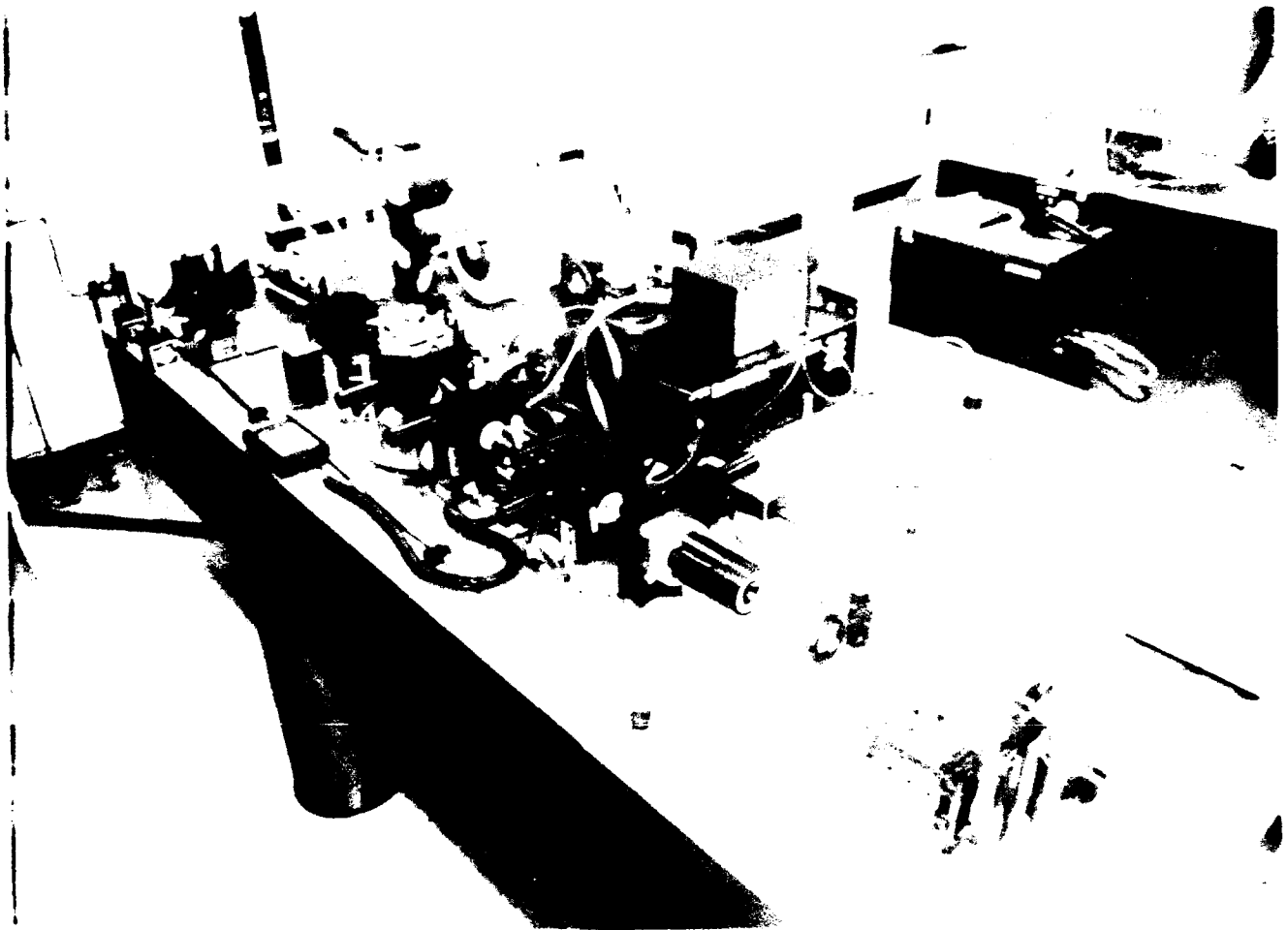
POINT OF CONTACT:

WL/MNGS

EGLIN AFB, FL 32542-5434

(904) 882-4636

DSN 872-4636



Electro-Optical Research Facility

FACILITY TYPE:

Laser Guidance Evaluation

PURPOSE:

Design, develop and evaluate laser radar sensors and seekers that employ miniature light sources; conduct research on components used in tactical LADAR systems

FACILITY NAME:

Laser Radar (LADAR) Development and Evaluation Research Facility

PRIMARY CAPABILITIES:

Main Lab: (1000 ft²) CAD workstations, electronic workbenches, image analysis workstations and waveform analysis

Range Facility Bldg 1: (3200 ft²) 2 vibration isolated optics labs and 80 ft indoor optics test range

Range Facility Bldg 2: (3200 ft²) Unmanned Air Vehicle hangar/maintenance space and electronics lab; LADAR test equipment and image evaluation work station

Two 6x6 vans to transport equipment and conduct tests at field sites

SPECIAL/UNIQUE CAPABILITIES:

Two modular LADAR testbeds enable easy replacement of all LADAR subsystems for system optimization and evaluation for various customer needs

Unmanned Aerial Vehicles (UAV): equipped with small solid state camera for scene and LADAR correlation

Ground station for real-time display and recording of imaging LADAR and TV data

INSTRUMENTATION:

Photometers, laser beam cross section analyzers, logic analyzers high speed oscilloscopes, solid state lasers, monochrometer

AVAILABILITY:

Primarily in-house use

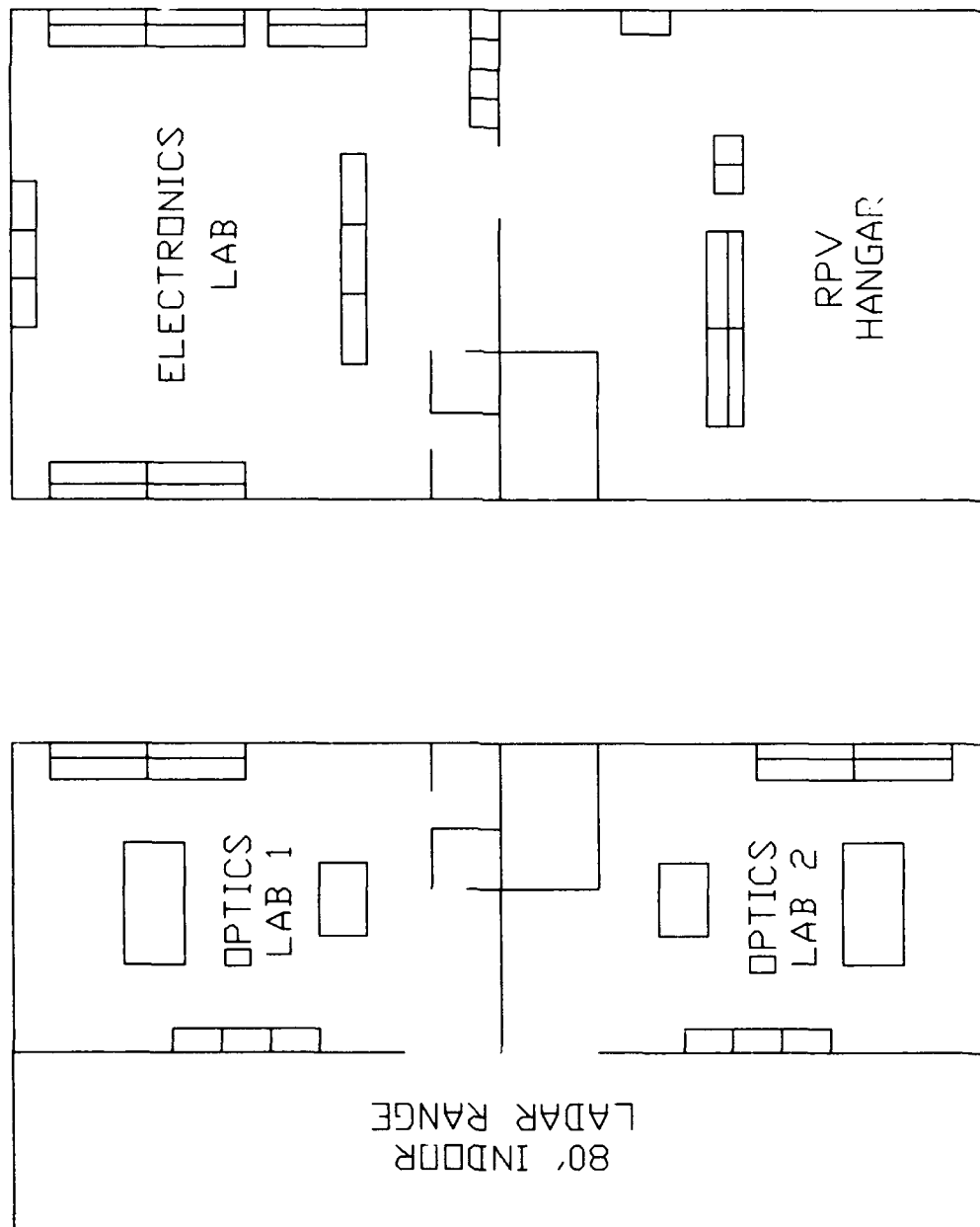
Limited use by other DOD agencies and Government contractors

LOCATION:

BUILDING: 13A ROOM: 281

POINT OF CONTACT:

WL/MNGS
EGLIN AFB, FL 32542-5434
(904) 882-2493
DSN 872-2493



Laser Radar (LADAR) Development and Evaluation Research Facility

FACILITY TYPE:

Guidance

PURPOSE:

Develop and evaluate sensors and seekers using radar guidance technology employing frequencies up to and including millimeter wave (MMW)

FACILITY NAME:

Radio Frequency/Millimeter Wave (RF/MMW) Facility

PRIMARY CAPABILITIES:

Main Lab: Calibration and measurement test benches; 94 GHz monopulse radar; X-band pulse doppler fire control radar

Penthouse: Roof level room with sliding windows to allow sensors to view area outside building; includes instrumentation and communication with main lab and tower

Tower: 3x3 meter room 10.6 meters above building 13A roof; elevator; 360 deg field of view; instrumentation and communication lines with main lab and tower

SPECIAL/UNIQUE CAPABILITIES:

Reflectivity Measurement System-determine relative reflectivity of sample materials at Ka or W-band frequencies (Main Lab)

Multi-Sensor Integration System-control and collect data real time from radar or IR/TV sensors or from both simultaneously for dual mode application

INSTRUMENTATION:

General and specialized test equipment for generating and measuring signals from DC to 110 GHz; measurements include power, frequency, phase, gain, loss, impedance

Variety of radar calibration targets such as corner reflectors, top hats, spheres

AVAILABILITY:

Primarily for in-house programs

LOCATION:

BUILDING: 13A ROOM: 484

POINT OF CONTACT:

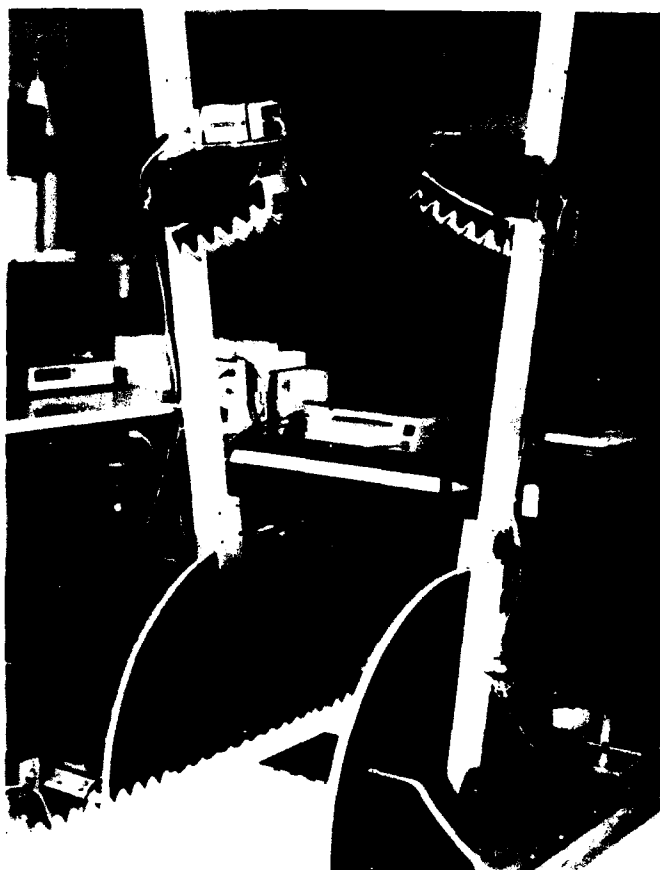
WL/MNGS

EGLIN AFB, FL 32542-5434

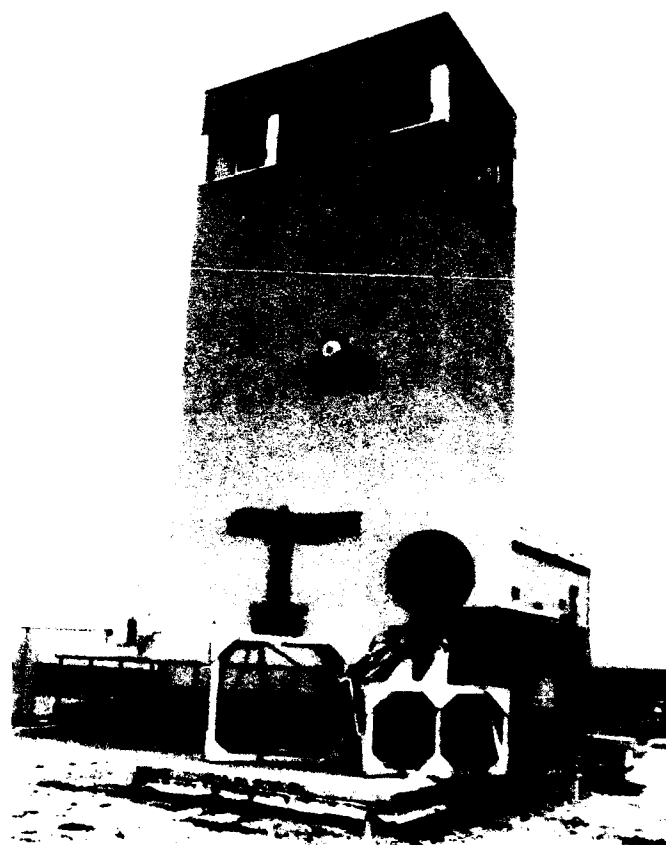
(904) 882-4631

DSN 872-4631

A view of the inside of the tower



Ka and W-band Reflectivity Measurement System (RMS)



A view of the roof showing the penthouse, tower and X-band radar antennas

Radio Frequency/Millimeter Wave (RF/MMW) Facility

FACILITY TYPE:

Munitions

PURPOSE:

Determine performance and behavior of explosive materials through state-of-the-art photographic and electronic techniques

FACILITY NAME:

Explosive Dynamics Facility

PRIMARY CAPABILITIES:

Test up to 20 pounds (TNT equivalent) of high explosives in test chamber

Access to AFDTC Test Range C-64C for air blast testing, bullet impact testing, large scale gap test, testing explosive charges greater than 20 pounds

Conduct critical diameter tests, small scale slow and fast cookoff tests, NOL gap tests, cylinder expansion tests, and plate dent tests

SPECIAL/UNIQUE CAPABILITIES:

Used for detonation of explosives

INSTRUMENTATION:

Test Chamber: streak cameras and framing cameras record shock wave propagation to 10 mm/microseconds

Time increment measurements with 5 nanosecond resolution

AVAILABILITY:

In-house, DOD Agencies, and Contractors

LOCATION:

BUILDING: 991 ROOM:

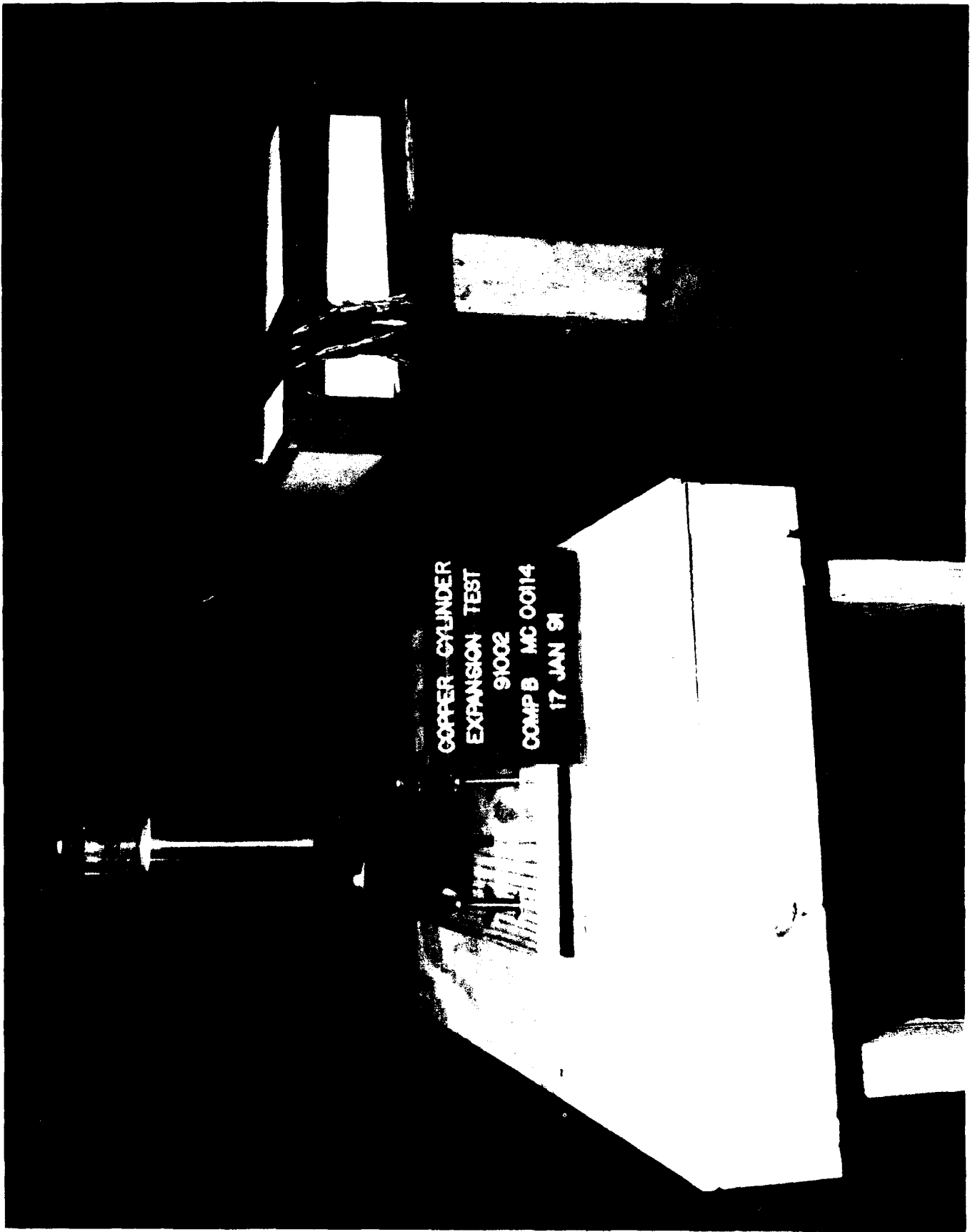
POINT OF CONTACT:

WL/MNME

EGLIN AFB, FL 32542-5434

(904) 882-3441

DSN 872-3441



Explosive Dynamics Facility

FACILITY TYPE:

Munitions

PURPOSE:

Provide high explosive processing, quality control, and loading support for the Air Force nonnuclear weapons development programs

FACILITY NAME:

Explosive Processing Facility

PRIMARY CAPABILITIES:

Load experimental munitions with up to 1000 pounds of an explosive formulation (standard or developmental) for performance evaluation

Develop processing techniques for loading Air Force munitions

Test experimental formulations for mechanical properties under environmentally controlled conditions up to 6 MeV

SPECIAL/UNIQUE CAPABILITIES:

Operate majority of equipment remotely and monitor on closed-circuit television

Monitor temperatures of all mixers, melt kettles and ovens in central control room

7 operations buildings with storage capacity up to 5,000 lbs of explosives; 7 storage buildings with total storage capacity up to 45,000 lbs explosives

INSTRUMENTATION:

500 Ton press, 10" isostatic press, 30-gal Baker-Perkins mixer, 100-gal melt kettle, 10 ft 3 vacuum tumble dryer, Instron mechanical tester

Growth and exudation chamber, 320 Kev fluoroscope, 450 Kev and 6 Mev x-ray; assorted small mixers and presses, explosive machining and forming

AVAILABILITY:

Supports In-House, DOD Agencies, and Contractors

LOCATION:

BUILDING: 1206 ROOM:

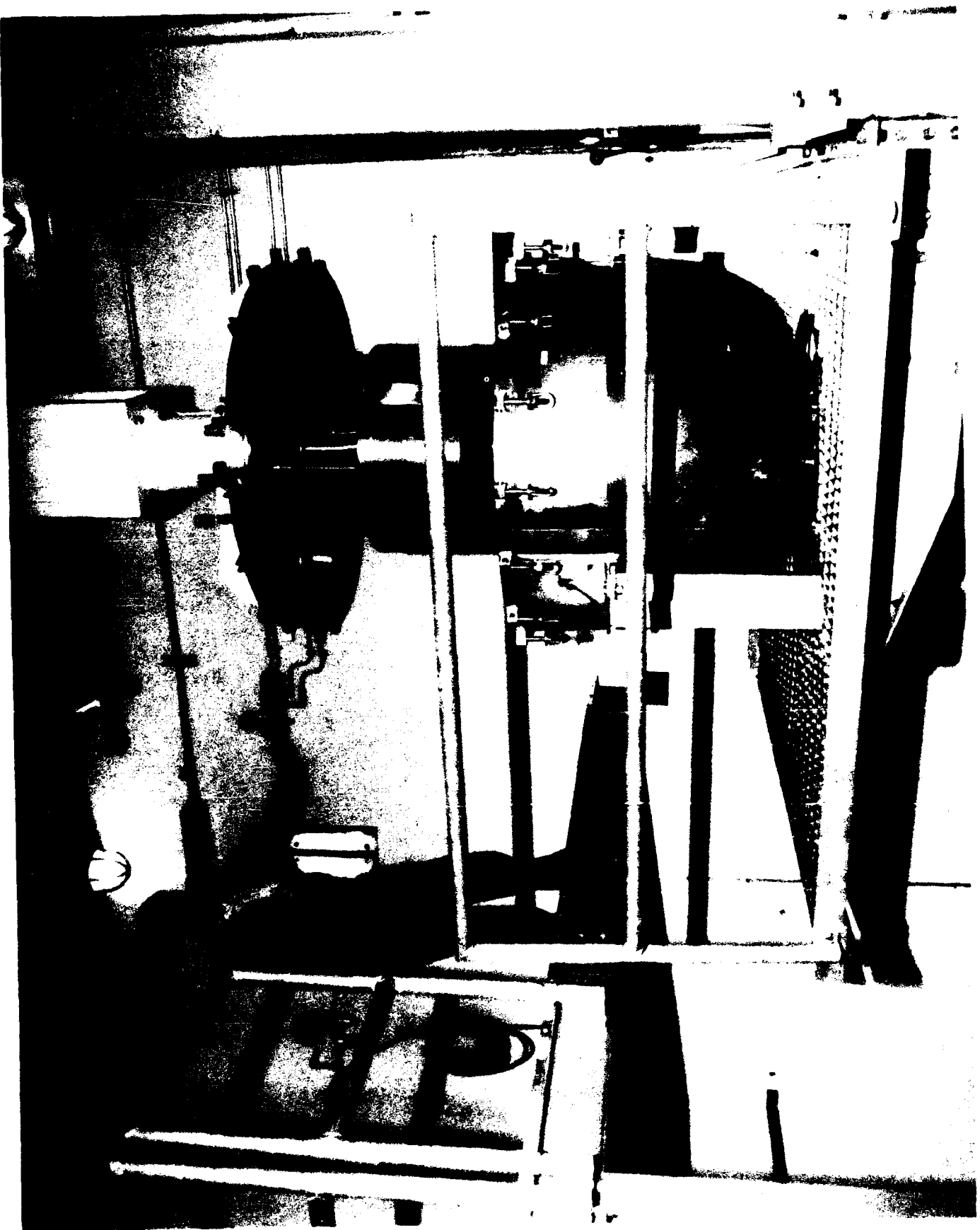
POINT OF CONTACT:

WL/MNME

EGLIN AFB, FL 32542-5434

(904) 882-9532

DSN 872-9532



Explosive Processing Facility

FACILITY TYPE:

Munitions

PURPOSE:

Develop composite explosive formulations for specific Air Force weapon systems; Custom chemical analysis of energetic materials

FACILITY NAME:

Explosive Research Properties Facility

PRIMARY CAPABILITIES:

Formulation & processing of meltcure & castcure to 1 pint scale; chemical, physical and thermal analysis, compatibility & environmental testing; accelerated aging

Sensitivity testing; shock, impact, friction electrostatic UTS, CRT, cookoff; binder development, kinetic studies; characterization of ingredients

Direct synthesis of explosives and correlation of structure to sensitivity

Computational abilities, Kamlet, BKW, JWL, Gurney, 2-D codes

SPECIAL/UNIQUE CAPABILITIES:

Explosive handling and storage

Testing supports the research and scale-up of insensitive explosives

INSTRUMENTATION:

Ultrasonic analyzer, viscometer, GC mass spec, FTIR, NMR, electron microscope, HPLC, GC, UV and visual spectrophotometry, calorimeter

Drop hammer, electrostatic tester, friction sensitivity, VTS and CRT

AVAILABILITY:

Supports In-House, DOD Agencies, and DOD Contractors

LOCATION:

BUILDING: 1200 ROOM:

POINT OF CONTACT:

WL/MNME

EGLIN AFB, FL 32542-5434

(904) 882-4212

DSN 872-4212



GAS CHROMATOGRAPHY

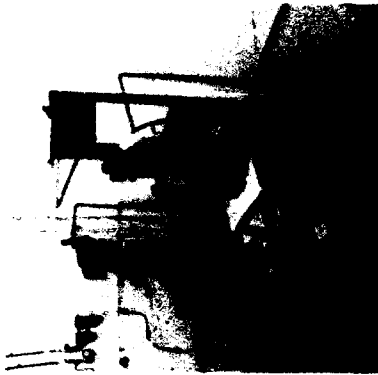
Explosive Research Properties Facility



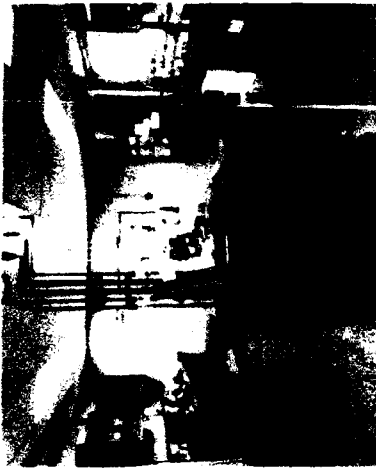
BUILDING 1200



GC / MASS SPECTROMETRY



SMALL SCALE MIXING



PREPARATIONS LAB

THERMAL / SAFETY



DROP HAMMER IMPACT SENSITIVITY



VACUUM THERMAL STABILITY



DIFFERENTIAL THERMAL ANALYSIS



DIFFERENTIAL SCANNING CALORIMETRY

FACILITY TYPE:

Munitions

PURPOSE:

Provide radiographic support for Air Force nonnuclear weapons development programs

FACILITY NAME:

X-Ray Facility

PRIMARY CAPABILITIES:

Fluoroscopic examination of bare and lightly cased explosives and propellants

X-ray of large, heavily cased munitions up to an equivalent of 10 inches of steel

SPECIAL/UNIQUE CAPABILITIES:

Large X-ray bay with two bridge cranes for manipulation and radiography of virtually any current or future conventional munition

INSTRUMENTATION:

320 Kev fluoroscope, 450 Kev X-ray (jib crane mounted),
6 Mev linear accelerator (bridge crane mounted)

AVAILABILITY:

Supports In-House, DOD Agencies and DOD Contractors

LOCATION:

BUILDING: 1239 ROOM:

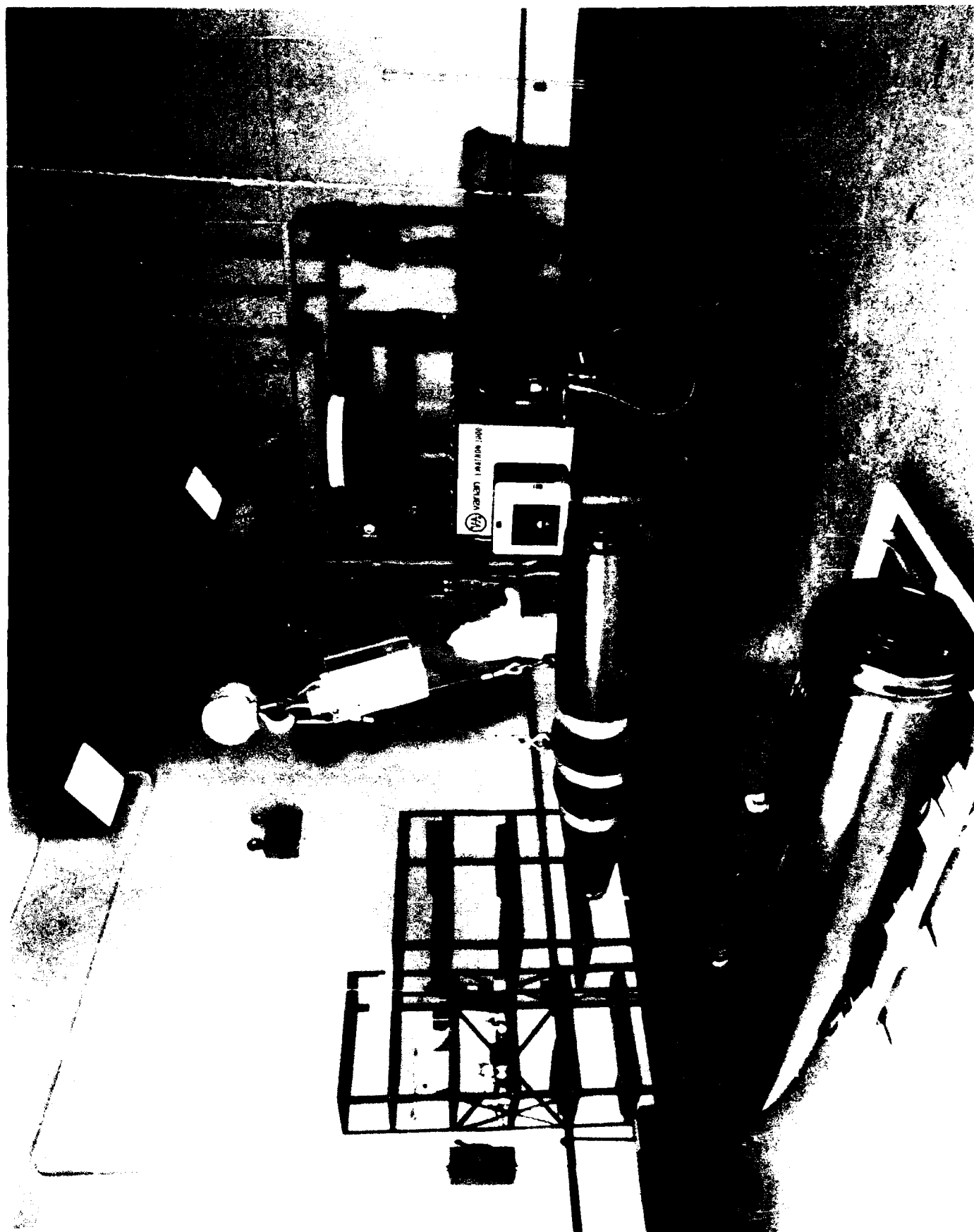
POINT OF CONTACT:

WL/MNME

EGLIN AFB, FL 32542-5434

(904) 882-9532

DSN 872-9532



X-Ray Facility

FACILITY TYPE:

Munitions

PURPOSE:

Develop and evaluate the technology for fuzes and fuze components for conventional munitions

FACILITY NAME:

Fuzes Research and Development Facility

PRIMARY CAPABILITIES:

Research and development of fuzes, sensors and associated signal processing circuitry for targets of interest

Electronic lab, explosive test bays, laser lab, aerosol chamber, printed circuit board fabrication equipment

SPECIAL/UNIQUE CAPABILITIES:

Equipment for high "G" testing, 155 mm smooth bore Howitzer gun, 152 ft vacuum gun, shock machines, explosive test bay

Located in buildings 432 and 410 (Bay 9)

INSTRUMENTATION:

Computers, shock hardened data recorders, shock switches, shock hardened accelerometers, instrumented aerosol chamber

AVAILABILITY:

Primarily in-house research and development

Available to US Government agencies and DOD contractors

LOCATION:

BUILDING: 432 ROOM: 7

POINT OF CONTACT:

WL/MNMF

EGLIN AFB, FL 32542-5434

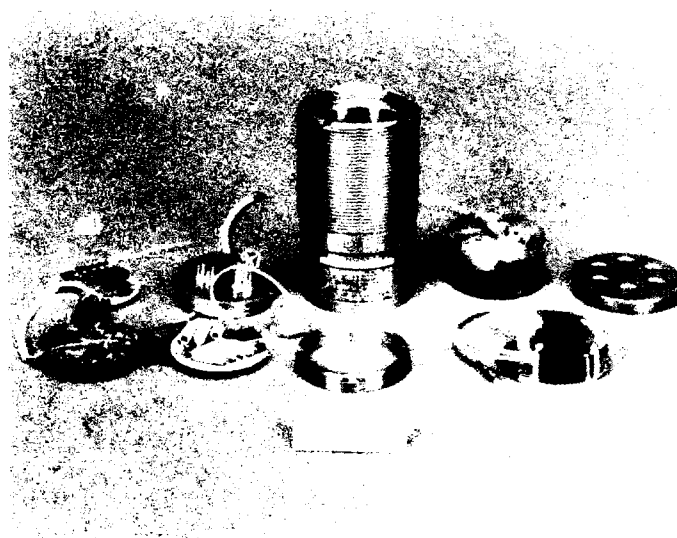
(904) 882-9431

DSN 872-9431

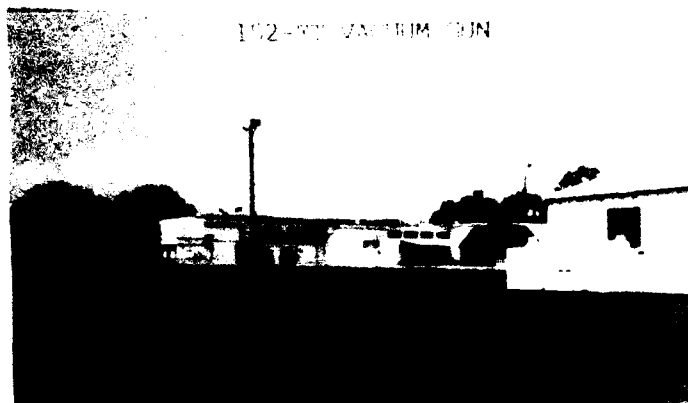
155MM TRUCK MOUNTED REHEATER



HARD TARGET DRY CLEANING



152-RT VACUUM TUN



Fuzes Research and Development Facility

FACILITY TYPE:

Munitions

PURPOSE:

Study the terminal ballistics of conventional and heavy metal warheads and penetrators

FACILITY NAME:

Advanced Warhead Experimentation Facility

PRIMARY CAPABILITIES:

Conduct R&D of heavy metal warhead technologies;
fabricate, test and characterize ordnance items
constructed of various conventional and heavy metals

Research items include warheads, projectiles, and
associated components such as penetrators, shaped charge
liners, and various explosives

Above items manufactured and tested while toxic effects
of potentially hazardous materials contained and air
filtered before reaching the outside environment

SPECIAL/UNIQUE CAPABILITIES:

Confined, evacuated chamber, 40ft x 40ft x 20ft, for
detonation tests; shop for machining heavy metals

Hardened control room, firing room for testing long
stand off mass focus warheads, housed 60mm gun,
materials dynamic properties lab, classified storage
area

Enclosed test arena provides for environmental
protection and testing during poor weather conditions
and eliminates surveillance

INSTRUMENTATION:

State-of-the-art automated, computer controlled system
for environmental monitoring, ensuring safety, security,
and communications

Located on range C64C

AVAILABILITY:

Available for USAF and other DOD sponsored research

Limited to conventional materials pending NRC approval
FY92

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/MNMW
EGLIN AFB, FL 32542-5434
(904) 882-2141
DSN 872-2141



Advanced Warhead Experimentation Facility

FACILITY TYPE:

Warhead materials testing and characterization

PURPOSE:

Provide the dynamic warhead material properties needed for continuum mechanics wave propagation computer codes (hydrocodes) penetration research

FACILITY NAME:

High Strain Rate Materials Facility

PRIMARY CAPABILITIES:

Provide quick response test capability to determine dynamic mechanical properties of metals being used in warhead development programs

Establish constitutive relations of metals for hydrocodes

Permit the mechanical characterization of metals from quasi-static strain rates and from room temperature to the highest practical temperatures

SPECIAL/UNIQUE CAPABILITIES:

Computerized data collection and control; fully instrumented Split-Hopkinson pressure bar for high strain rate analysis

Bi-axial servo hydraulic system with computer controlled loading capabilities plus a low strain rate tensile tester with environmental chamber

High strain rate tester for miniature samples; self contained 2-inch gas gun with environmental chamber; limited metallographic equipment

INSTRUMENTATION:

Multichannel interval meters; time delay generators; high speed counters; high speed digitizers; signal conditioning units; strain gauges

RTD-type sensors; carbon manganin gauges; piezoelectric pins; and velocity measurements

AVAILABILITY:

Available for USAF and other DOD sponsored research

LOCATION:

BUILDING: 13 ROOM: 159

POINT OF CONTACT:

WL/MNMW
EGLIN AFB, FL 32542-5434
(904) 882-2141
DSN 872-2141



High Strain Rate Materials Facility

FACILITY TYPE:

Research

PURPOSE:

To support munition technology programs and environmental assessment requirements through chemical, radiochemical and microanalysis research

FACILITY NAME:

Environmental Sciences Facility

PRIMARY CAPABILITIES:

Analyses and research efforts in conventional munitions environmental technology development at the chemical, biological, microscopic, and radioactive level

Quantitatively determine contaminants in chemicals, explosives, fuels, soils, or water including on-the-spot analysis to determine residual metal contaminate levels

Automated image analysis for material and particle studies

Process data and prepare documentation to insure compliance with all local, state and federal regulations and laws

SPECIAL/UNIQUE CAPABILITIES:

Micrographs produced from scanning electron microscope

Life cycle testing of conventional ammunition; warheads research using depleted uranium and a field portable laboratory

INSTRUMENTATION:

Inductively coupled plasma emission spectrophotometer, infrared and ultraviolet spectrophotometer

Scanning electron microscope, X-ray fluorescence and Kevex energy dispersive spectrometer

Metallurgist-XR Portable XRF Analysis System, low background alpha/beta, liquid and gamma scintillation counting system, gas chromatography

AVAILABILITY:

In-house and field research and monitoring of the environment

LOCATION:

BUILDING: 13 ROOM: 257

POINT OF CONTACT:

WL/MNOE

EGLIN AFB, FL 32542-5434

(904) 882-4446

DSN 872-4446

146



Environmental Sciences Facility

FACILITY TYPE:

Model Fabrication

PURPOSE:

Provide a wide range of rapid fabrication support in the areas of exploratory and advanced development of both experimental and prototype hardware designs

FACILITY NAME:

Model Fabrication Facility

PRIMARY CAPABILITIES:

Produce, assemble, and modify both full and sub-scale aeroballistic, aerodynamic and aeromechanical assemblies and components for experimental munition application

Accomplish tolerance and interference checks on projectiles, modular weapons interface components, and suspension and release prototype hardware

SPECIAL/UNIQUE CAPABILITIES:

Machine, grind, lap, or polish complex part to surfaces of 4 to 6 microns; machining of high explosives by remote control

Machining, sheet metal, welding, fiberglass, and plastics; cut and work material up to 8" thick armor steel plate and round stock 30" dia x 14' long

CAE/CIM capability to create, design, modify and machine futuristic configurations impossible by conventional methods

INSTRUMENTATION:**AVAILABILITY:**

Wright Laboratory, Armament Directorate

LOCATION:

BUILDING: 614 ROOM: 1

POINT OF CONTACT:

WL/MNOM

EGLIN AFB, FL 32542-5434

(904) 882-2648

DSN 872-2648



Model Fabrication Facility

FACILITY TYPE:

Electromagnetic Launchers/Railguns (EMLs)

PURPOSE:

Investigate velocity limiting mechanisms for ELMs operating in a high velocity (>4 km/sec) regime; repeatability for EMLs in a multi-shop configuration

FACILITY NAME:

Basic Research Facility

PRIMARY CAPABILITIES:

Contains three separate power supplies and two separate gun bays

Gun bay 1: experiments on guns from 30mm to 75mm bore size; small bore research into rail, insulator, and armature options

Gun bay 2: provide multi-shot operation for investigating bore lifetime issues and for addressing injector integration

SPECIAL/UNIQUE CAPABILITIES:

Repeatedly provides pulsed power on the order of 1MA and 100V for hundreds of experiments

Current pulse shaping through staged capacitor bank discharge and multiple guns available of varying bore size and length

Located at Site A-15, building 12522

INSTRUMENTATION:

96 Nicolet DAS channels/NIC 500: 32 @ 1MHz, 8 @ 2MHz, 16 @ 10 MHz/NIC 4092-40 @ 2MHz

Gun diagnostics: rail & armature magnetic field probes; light emission probes, in-bore spectroscopy, pressure transducers and heat flux gages; rail motion detector

AVAILABILITY:

Primarily In-House

Available to US Govt agencies, US Govt sponsored contractors and universities

LOCATION:

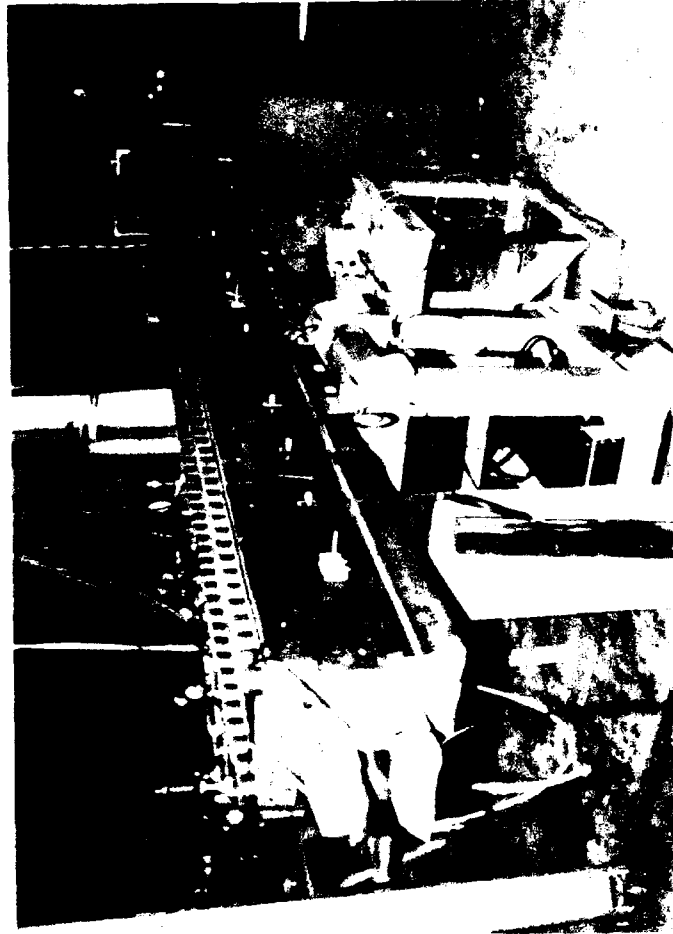
BUILDING: ROOM:

POINT OF CONTACT:

WL/MNSH
WPAFB, OH 32542-5434
(904) 882-0316
DSN 872-0316



Basic Research Facility



FACILITY TYPE:

Electromagnetic Launchers/Railguns

PURPOSE:

Develop methods & diagnostic techniques for measuring plasma armature characteristics for electromagnetic launchers (EMLs)

FACILITY NAME:

Diagnostics Research Facility

PRIMARY CAPABILITIES:

Powered by a capacitor system which can produce 400kJ of stored energy in an 11kV, 600 kA pulse

Develops methods and diagnostic techniques for measuring armature characteristics (pressure, density, temperature, composition, current distribution) in-bore

Experimental measurements used to validate models and theories for determining armature performance in railguns

Techniques developed include spectrograms of in-bore plasma, determination of muzzle flash constituents, soft x-ray, & measurements of bore press., heat flux, etc

SPECIAL/UNIQUE CAPABILITIES:

Quick turnaround capability of Plasma Utility Gun (PUG) allows numerous experiments per day

Located at Site A-15, building 12549

INSTRUMENTATION:

24 channels Le Croy 6810: 6 modules with 4 channels/module @ 2m Hz

AVAILABILITY:

Primarily In-House

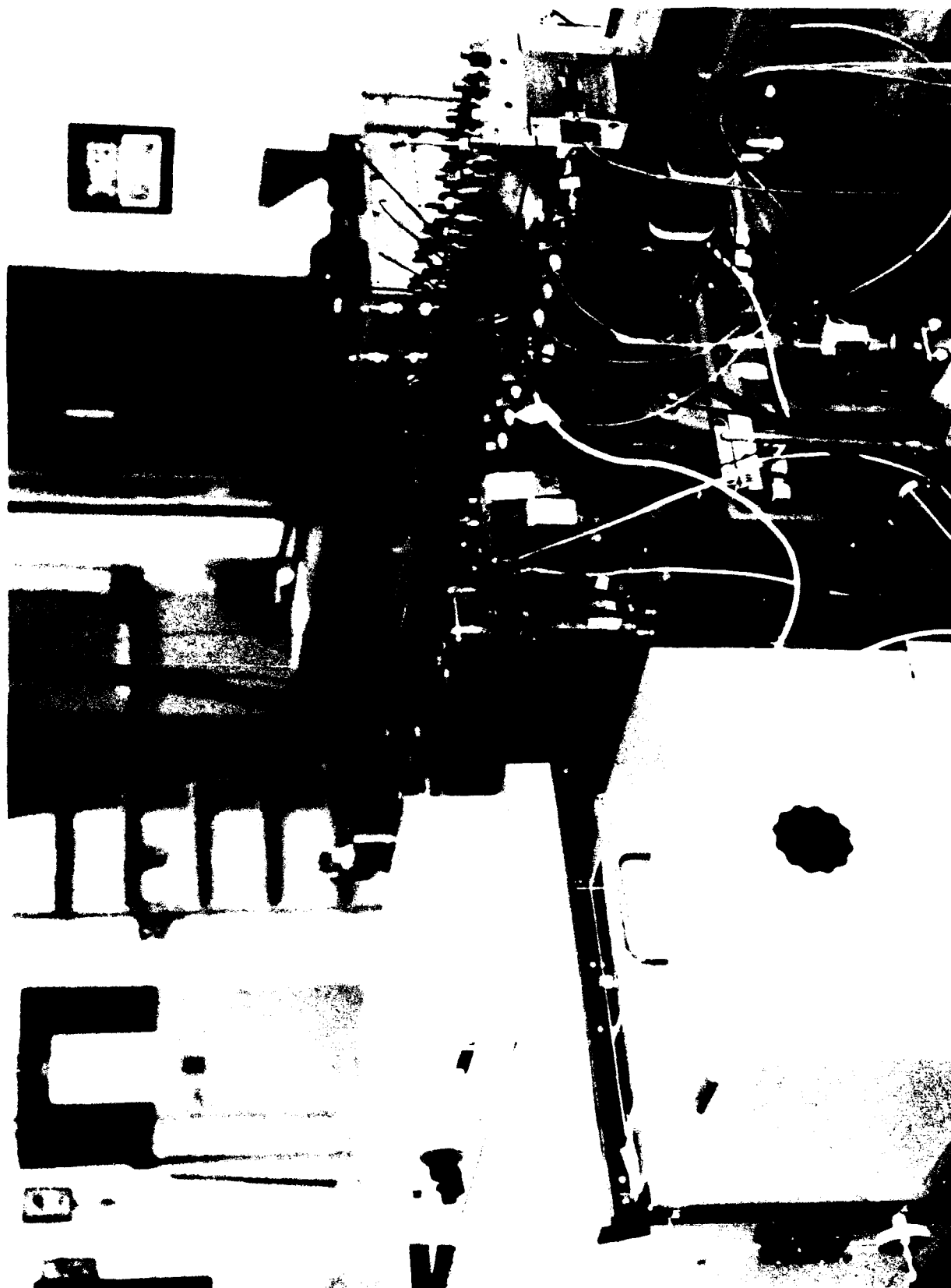
Available to US Govt agencies, US Govt sponsored contractors and universities

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/MNSH
EGLIN AFB, FL 32542-5434
(904) 882-0316
DSN 872-0316



Diagnostics Research Facility

FACILITY TYPE:

Electromagnetic Launchers/Railguns

PURPOSE:

Research and development of high energy, multi-shot electromagnetic launchers (EMLs)

FACILITY NAME:

High Energy Research Facility

PRIMARY CAPABILITIES:

Used for research into high energy management and large bore EM guns research

System being upgraded to supply 5 million Amps for over 5 secs and store 500 million Joules of magnetic energy in a multi-turn solenoid inductor

Will require more than 45,000 batteries operating between 50 and 220 volts

Will support multi-shot research with large bore railguns 60 to 120mm in diameter and over 18mm in length

SPECIAL/UNIQUE CAPABILITIES:

Because of the long pulse duration, can be used for multi-shot, high energy launcher research

Can be used for high, direct-current opening switch research

400 mile test range for long-range hypervelocity launcher research and development

INSTRUMENTATION:

130 channels DSP digitizers: 16 @ 1MHz, 16 @ 500 KHz, and 98 @ 100 KHz, all with 1 MB storage each

System currently non-operational, undergoing upgrade; available in Fall 1993

Located at Site A-15, building 12555

AVAILABILITY:

Primarily In-House

Available to US Govt agencies, US Govt sponsored contractors and universities

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/MNSH
EGLIN AFB, FL 32542-5434
(904) 882-0395
DSN 872-0395



High Energy Research Facility

FACILITY TYPE:

Electromagnetic Launchers/Railguns

PURPOSE:

Provide switching of high current power to experimental switches and electromagnetic launchers (EMLs)

FACILITY NAME:

Multi-Shot Research Facility

PRIMARY CAPABILITIES:

Pneumatically actuated switches are fired to initiate power flow and create pulses of energy to charge a 10 MJ inductor for various experimental switches & EMLs

SPECIAL/UNIQUE CAPABILITIES:

A five second pulse at over 250kA is produced by an array of over 900, 12v lead acid automotive batteries to produce a high current 5 sec electromagnetic pulse

Gun bay is 12.2 meters x 12.2 meters

INSTRUMENTATION:

48 channels of Nicolet 4094 oscilloscopes; additional capabilities can be requested

System controller to monitor individual battery health and control of switch and EML hardware

Located at Site A-15, building 12521

AVAILABILITY:

Primarily In-House

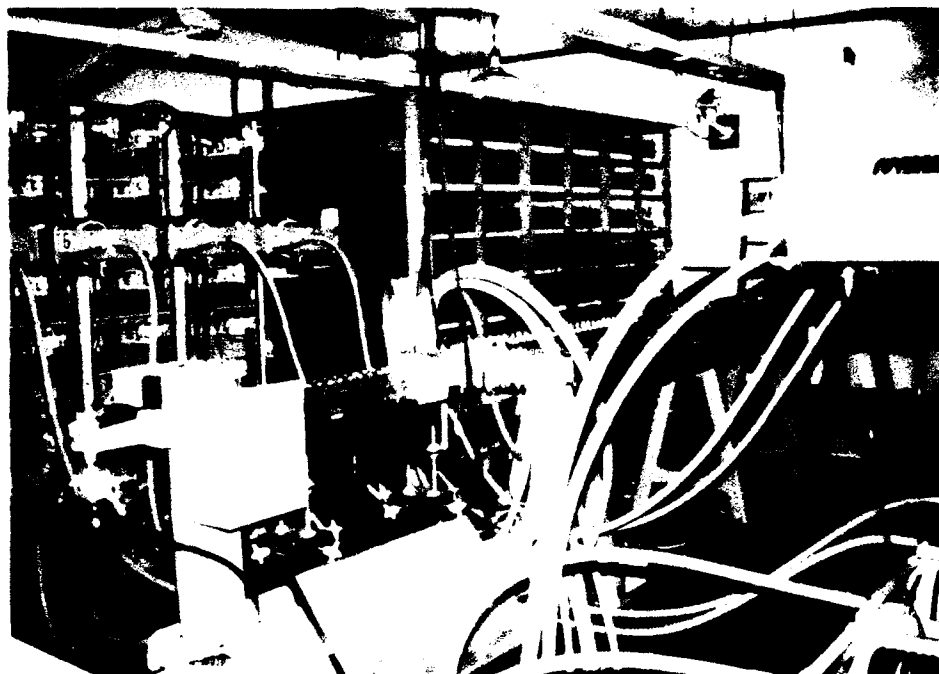
Available to US Govt agencies, US Govt sponsored contractors and universities

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/MNSH
EGLIN AFB, FL 32542-5434
(904) 882-0316
DSN 872-0316



Multi-Shot Research Facility

FACILITY TYPE:

Electromagnetic Launchers/Railguns

PURPOSE:

Research and development of scaled opening switches and moderate energy, medium bore electromagnetic launchers (EMLs)

FACILITY NAME:

Switch Research Facility

PRIMARY CAPABILITIES:

Used with an augmenting coil to perform scaled, direct current opening switch research at lower current/energy levels

Used as a developmental power supply for multi-shot electromagnetic launcher research at moderate energy levels

Provides up to 750 kA of current for 200 milli-seconds; stores 2 million Joules of magnetic energy in cryogenic inductor

Comprised of Homopolar generator operating up to 13,000 rpm; utilized with medium bore, moderate power railguns of various sizes (10 to 75mm)

SPECIAL/UNIQUE CAPABILITIES:

Quick turnaround capability allows three to five experiments/day

Located at Site A-15, building 12553

INSTRUMENTATION:

130 channels DSP digitizers: 16 @ 500 KHz and 98 @ 100 KHz, all with 1 MB storage each

AVAILABILITY:

Primarily In-House

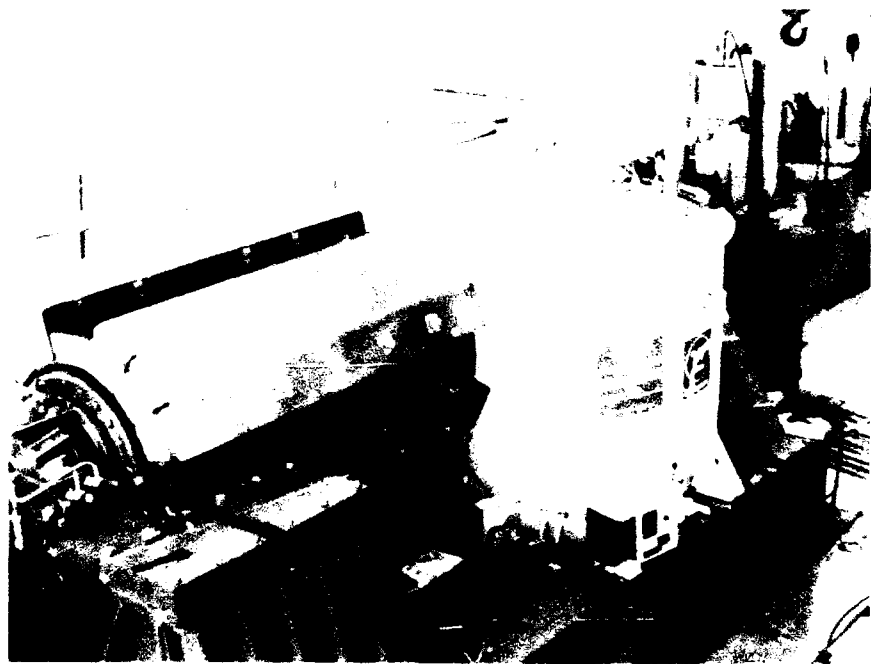
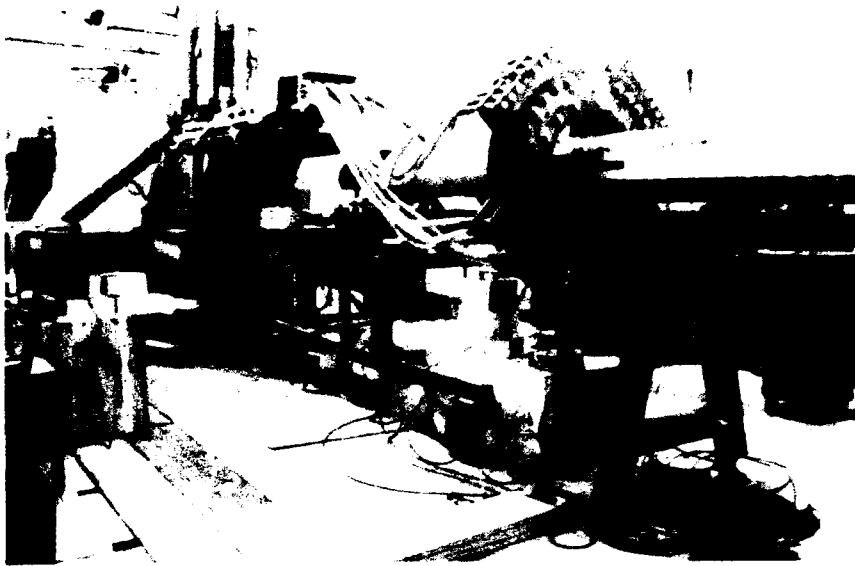
Available to US Govt agencies, US Govt sponsored contractors and universities

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/MNSH
EGLIN AFB, FL 32542-5434
(904) 882-0395
DSN 872-0395



Switch Research Facility

FACILITY TYPE:

Strategic Defense Hardware-in-the-Loop (HWIL) Simulation

PURPOSE:

Provide national resource for nondestructive HWIL performance testing of exoatmospheric interceptor systems and subsystems

FACILITY NAME:

Kinetic Kill Vehicle Hardware-in-the-Loop Simulation Facility (KHILS)

PRIMARY CAPABILITIES:

Digital and HWIL simulators to realistically simulate launch-to-impact scenarios for guided interceptors

Four color (4.5, 5.6, 9.28, 10.6 μ m), high frame rate (400Hz digital, 3280Hz optical), high contrast dynamic IR scene projector, resolution of 96x96 pixels

Digital scene generation of boost, post-boost, and RV targets; high speed signal injection with seeker effects and line-of-sight motion modeled in real-time

High bandwidth flight motion simulator, 45Hz, 25lb payload, +/- 10deg pitch, yaw, +/- 120deg roll, 17 microradial pointing accuracy

SPECIAL/UNIQUE CAPABILITIES:

Integrated testing of seekers having starring focal plane arrays using state-of-the-art dynamic IR scene projection systems

Support high speed digital signal injection into signal processors; currently developing UV projection capability

INSTRUMENTATION:

NIST traceable black body source, IR calibration detector, multi-channel stripchart recorders, logic analyzers, oscilloscopes

AVAILABILITY:

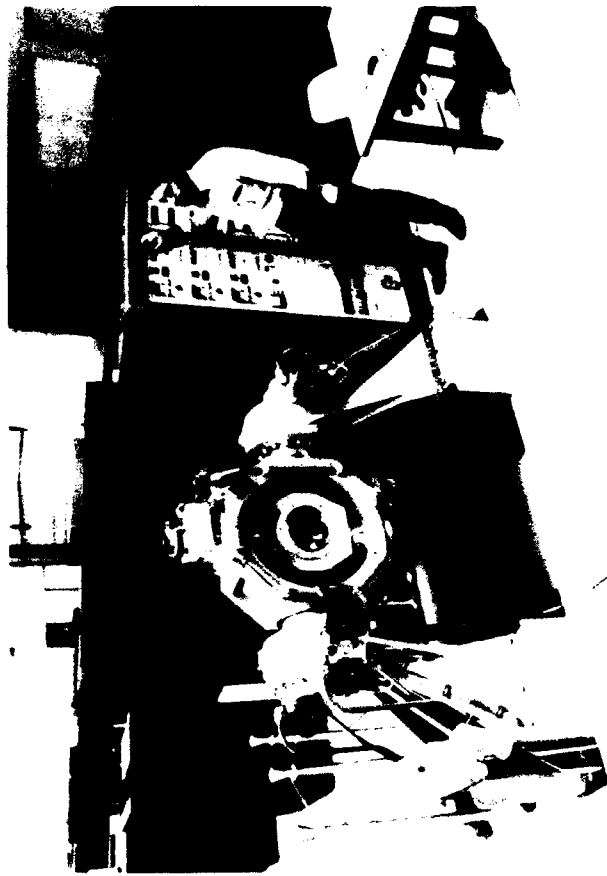
Available to US Government agencies and Government contractors

LOCATION:

BUILDING: 13A ROOM: Bay 3

POINT OF CONTACT:

WL/MNSI
EGLIN AFB, FL 32542-5434
(904) 882-3160
DSN 872-3160



High Bandwidth Flight Motion Simulator



Real-Time Computer Suite



4 Color IR Scene Projector

Kinetic Kill Vehicle Hardware-in-the-Loop
Simulation Facility (KHILS)

FACILITY TYPE:

Strategic Defense Neural Network and Signal Processing

PURPOSE:

To perform signal processing and neural network development and analysis for exo-atmospheric guided interceptors

FACILITY NAME:

Neural Network and Signal Processing Facility

PRIMARY CAPABILITIES:

Mac II with neural network analysis software and another Mac II for analysis work

A VT340 for network access to base computers

A 386 PC with a neural network accelerator board and neural network analysis software

A Sun Sparc 1 which is available for signal processing analysis and software evaluation; scanner and controller to support signal processing analysis

SPECIAL/UNIQUE CAPABILITIES:**INSTRUMENTATION:****AVAILABILITY:**

Available to US Government agencies and contractors

LOCATION:

BUILDING: 13 ROOM: 350

POINT OF CONTACT:

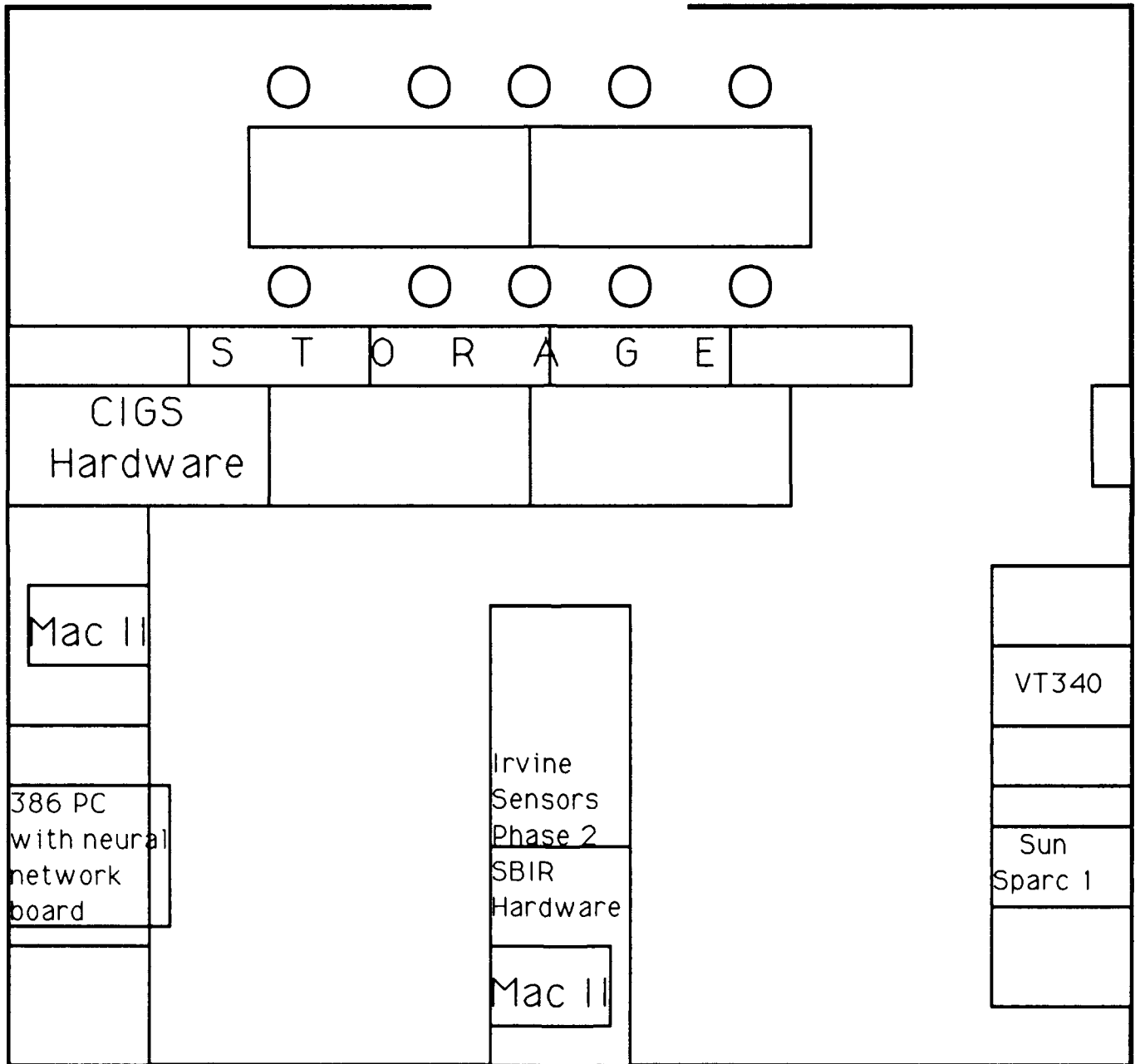
WL/MNSI

EGLIN AFB, FL 32542-5434

(904) 882-3160

DSN 872-3160

NEURAL NETWORK AND SIGNAL PROCESSING FACILITY



Bldg 13 Room 350

FACILITY TYPE:

Scene Generation Facility for Strategic Defense

PURPOSE:

To generate realistic digital imagery to support sensor system design, to provide imagery for KHILS facility

FACILITY NAME:

Synthetic Scene Generation Facility (SSGF)

PRIMARY CAPABILITIES:

Premier user of the SDIO sponsored Strategic Scene Generation Model and beta site for several phenomenology codes (MDOSC, SFM, SSGM, CHAMP)

SSGF has identified phenomena not currently in SSGM and has developed a unique capability to generate signatures which include transient events (flashing in

(cont) plume), Post Boost Vehicle/Re-entry Vehicles, sensor effects, seeker motion, aerodynamic booster heating, aero-optical and aero-thermal effects with

(cont) various scanning techniques; limited capability to generate UV waveband imagery exists

SPECIAL/UNIQUE CAPABILITIES:**INSTRUMENTATION:****AVAILABILITY:**

Available to US Government agencies and contractors

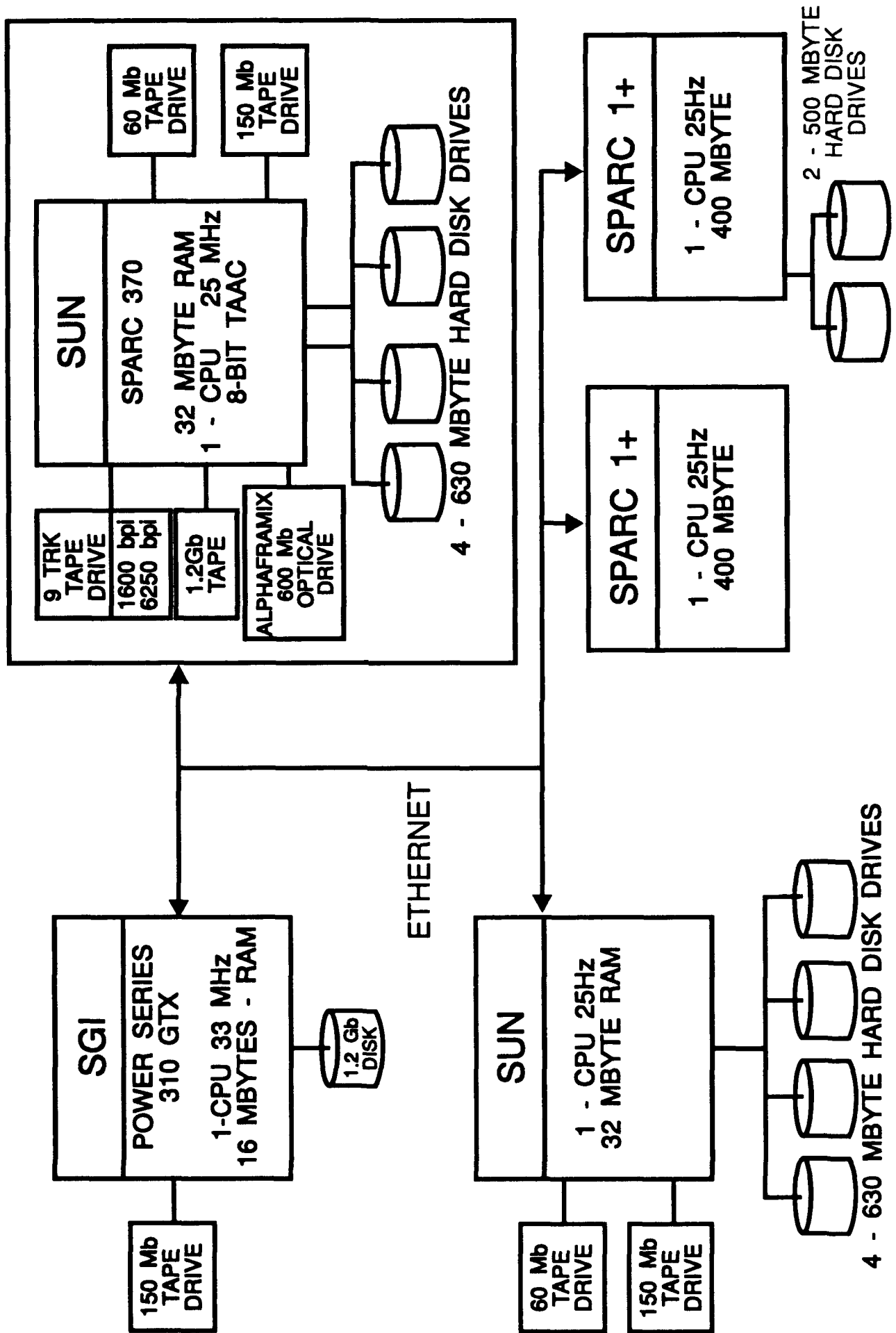
LOCATION:

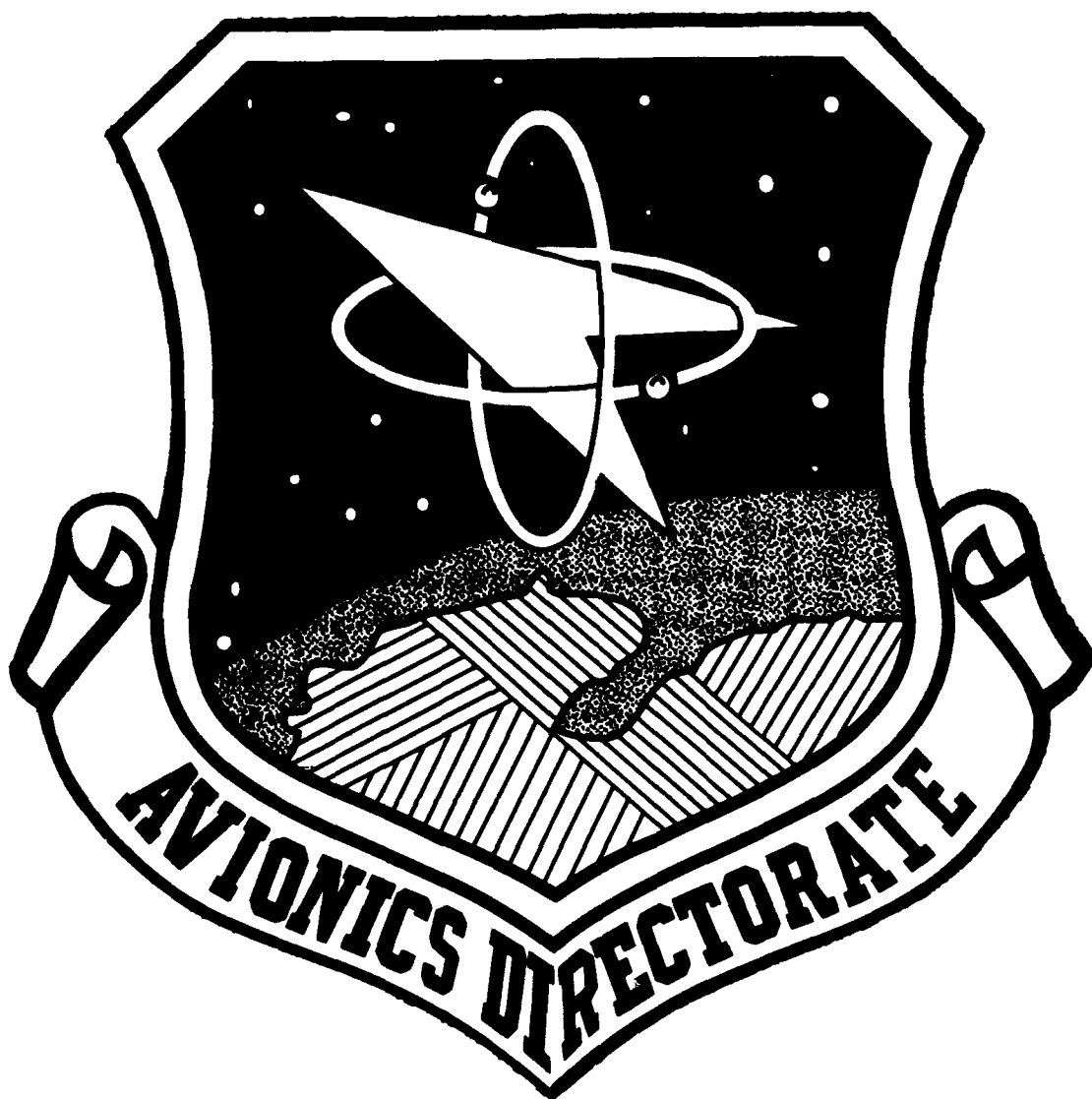
BUILDING: 13 ROOM: 304-6

POINT OF CONTACT:

WL/MNSI
EGLIN AFB, FL 32542-5434
(904) 882-3160
DSN 872-3160

SYNTHETIC SCENE GENERATION FACILITY (SSGF)





FACILITY TYPE:

Artificial Intelligence (AI)

PURPOSE:

Artificial intelligence research and development with emphasis on near-term transition and application of AI technologies

FACILITY NAME:

Artificial Intelligence Technology Laboratory

PRIMARY CAPABILITIES:

Evaluate and prototype applications of AI technology

Provide AI education and training

Evaluate AI-related hardware and software

SPECIAL/UNIQUE CAPABILITIES:

AI Technology Office (AITO), bldg 620: Vaxstation 3s, Sun 3/60, Symbolics 3650, Z-248s with AI Architect 80386 Hummingboards, Macintosh II, laser printers

Dayton Center for AI Application (CAIA), Miami Valley Research Park: computing facilities distributed throughout a consortium of seven Ohio universities

INSTRUMENTATION:

None

AVAILABILITY:

AITO: Available to U.S. Government agencies

CAIA: Available to U.S. Government agencies and industry

LOCATION:

BUILDING: 620 ROOM: S1J68

POINT OF CONTACT:

WL/AAA-1

WPAFB, OH 45433-6523

(513) 255-5800

DSN 785-5800

ARTIFICIAL INTELLIGENCE TECHNOLOGY OFFICE
COMPUTING FACILITIES



FACILITY TYPE:

Crew Systems Integration

PURPOSE:

Three dimensional cockpit displays, optical signal processing

FACILITY NAME:

Laser Optics Laboratory

PRIMARY CAPABILITIES:

Optical holography for displays

Optical signal processing

Holographic optical elements

SPECIAL/UNIQUE CAPABILITIES:

Vibration isolated optical bench system

Class IV laser facility

Facility located within Tempest area

INSTRUMENTATION:

Class IV Ar-ion laser, variety of class III and lower lasers (He-Ne, HeCad, Ar-ion)

Spatial light modulator (Hughes LCLV)

Image digitization camera (Eikonix), MicroVAX II, 486 IBM PC clone, optical spectrum analyzer (465nm - 525nm)

AVAILABILITY:

Available to U.S. Government agencies

Some industry availability

LOCATION:

BUILDING: 146 ROOM: 114

POINT OF CONTACT:

WL/AAA-2

WPAFB, OH 45433-6553

(513) 255-8261

DSN 785-8261



Laser Optics Laboratory

FACILITY TYPE:

Embedded Software

PURPOSE:

Develop, test and evaluate new technologies designed to improve support capability of avionics embedded system software

FACILITY NAME:

Embedded Computer Resources Support Improvement Facility (ESIF)

PRIMARY CAPABILITIES:

Ada in embedded, distributed, integrated systems; software models, real-time simulation

Avionics integration support environments, embedded computer emulation, real-time networks

Software performance monitoring, test methodology and test criteria

Identification, development and evaluation of embedded software support technologies.

SPECIAL/UNIQUE CAPABILITIES:

F-16, F-111, A-10, B-2, F-15 displays

F-16 Fire Control Computer Support Environment

Provide platform for software research and development

INSTRUMENTATION:

Special purpose support hardware and software, actual embedded computers and controls, graphics equipment

MicroVAX(s), Transputers, Intel 80386(s), MIL-STD-1750A(s), Motorola 68020(s), National 32532(s)

AVAILABILITY:

To ALC's on joint efforts with AAAF on non-interference basis

LOCATION:

BUILDING: 620 ROOM: 3rd FL

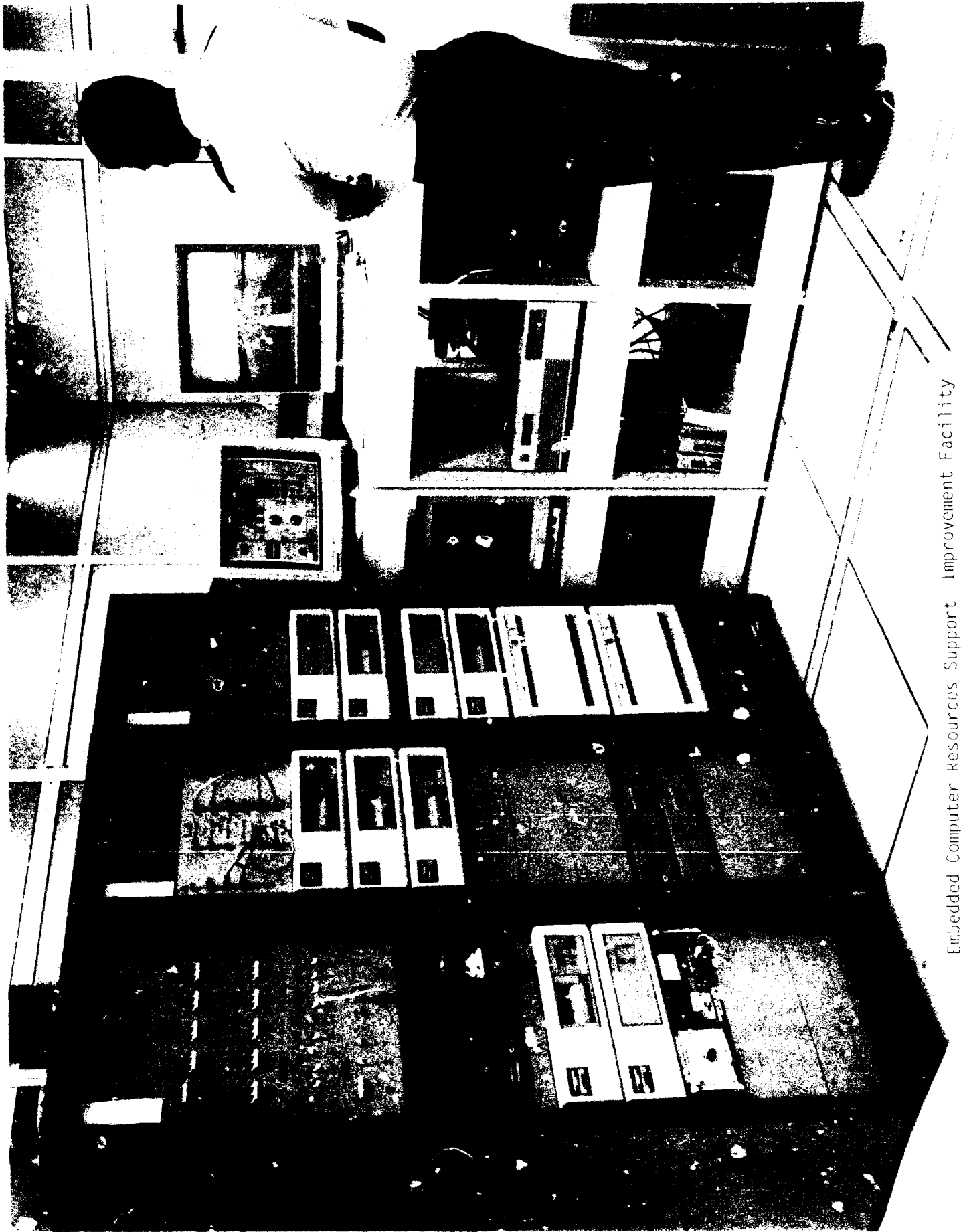
POINT OF CONTACT:

WL/AAAF

WPAFB, OH 45433-6543

(513) 255-3826

DSN 785-3826



Embedded Computer Resources Support Improvement Facility

FACILITY TYPE:

Communication

PURPOSE:

Research, development, and evaluation of Low Probability of Intercept (LPI) and Low Probability of Exploitation (LPE) communication systems

FACILITY NAME:

Communication Systems Evaluation Laboratory (CSEL)

PRIMARY CAPABILITIES:

Computer controlled generation of threat and interference signals to provide realistic background and jamming signal environments for dynamic evaluation

Provide dynamic evaluation of state-of-the-art CNI systems in the Integrated Electromagnetic System Simulator (IESS)

SPECIAL/UNIQUE CAPABILITIES:

Avionics Communication System Simulator (ACSS): 6 channel transmitter providing computer controlled signal generation in HF, VHF, UHF, and L-Band frequency bands

Has a wide variety of RF modulation capabilities including AM, FM, OOK, BPSK, MSK, FSK, and frequency hopping (up to 20,000 h/s)

INSTRUMENTATION:

User Defined Operations and Interactive Test (UDOIT) software allows interactive control with equipment listed above

Can create custom test and evaluation scenarios which can be saved and precisely repeated at later date

UDOIT software also provides user with the capability for automated data collection

AVAILABILITY:

Primarily in-house

LOCATION:

BUILDING: 620 ROOM: S3P38

POINT OF CONTACT:

WL/AAAI

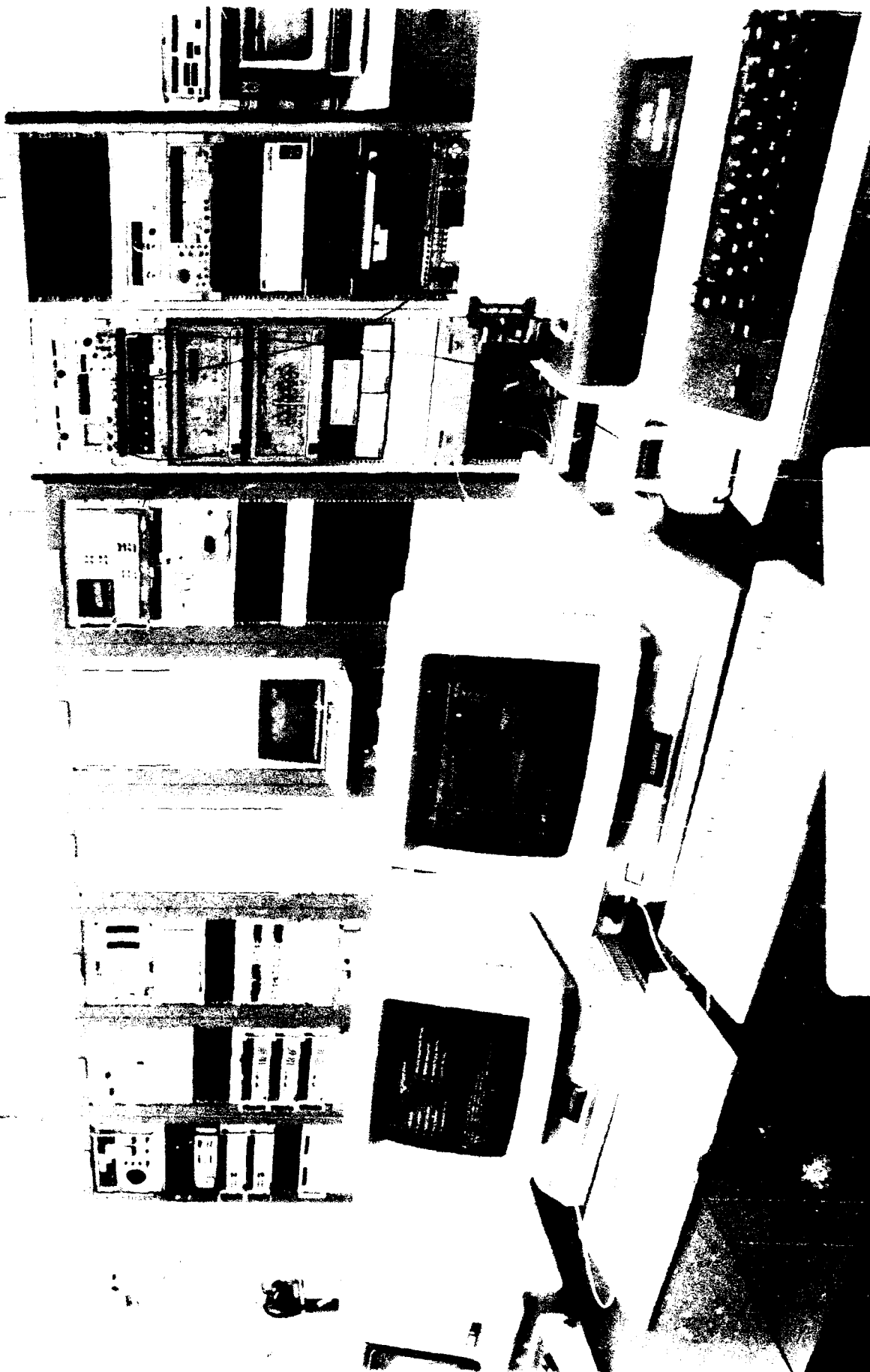
WPAFB, OH 45433-6543

(513) 255-2766

DSN 785-2766

EVALUATION LABORATORY

COMMUNICATION SYSTEMS



FACILITY TYPE:

Communication

PURPOSE:

Simulation and validation of Global Strike technologies via advanced Integrated Communication, Navigation, Identification Avionics (ICNIA) system

FACILITY NAME:

Integrated Electromagnetic System Simulator (IESS)

PRIMARY CAPABILITIES:

Real-time dynamic testing of integrated avionics systems in realistic operational scenarios

Simultaneously generates a variety of CNI waveforms: Global Positioning System, Tactical Air Navigation, Microwave Landing System, Instrument Landing System

Also Single Channel Ground and Air Radio System, Joint Tactical Information Distribution System, Have-Quick

Also HF, VHF, and UHF Narrowband Communications, and Mark XII Identification Friend or Foe

SPECIAL/UNIQUE CAPABILITIES:

Only simulator available to test integrated avionics systems in groundbased coordinated scenario situation at the sensor level

TEMPEST qualified facility

Interfaced with other AA laboratories to provide a cooperative, real-time, interactive pilot-in-the-loop simulation capability

INSTRUMENTATION:

Simulators for above waveforms, MIL-STD-1553B and IEEE-488 interface to Unit Under Test (UUT)

Oracle database management system for data analysis

AVAILABILITY:

Primarily in-house

LOCATION:

BUILDING: 620 ROOM: S3P45

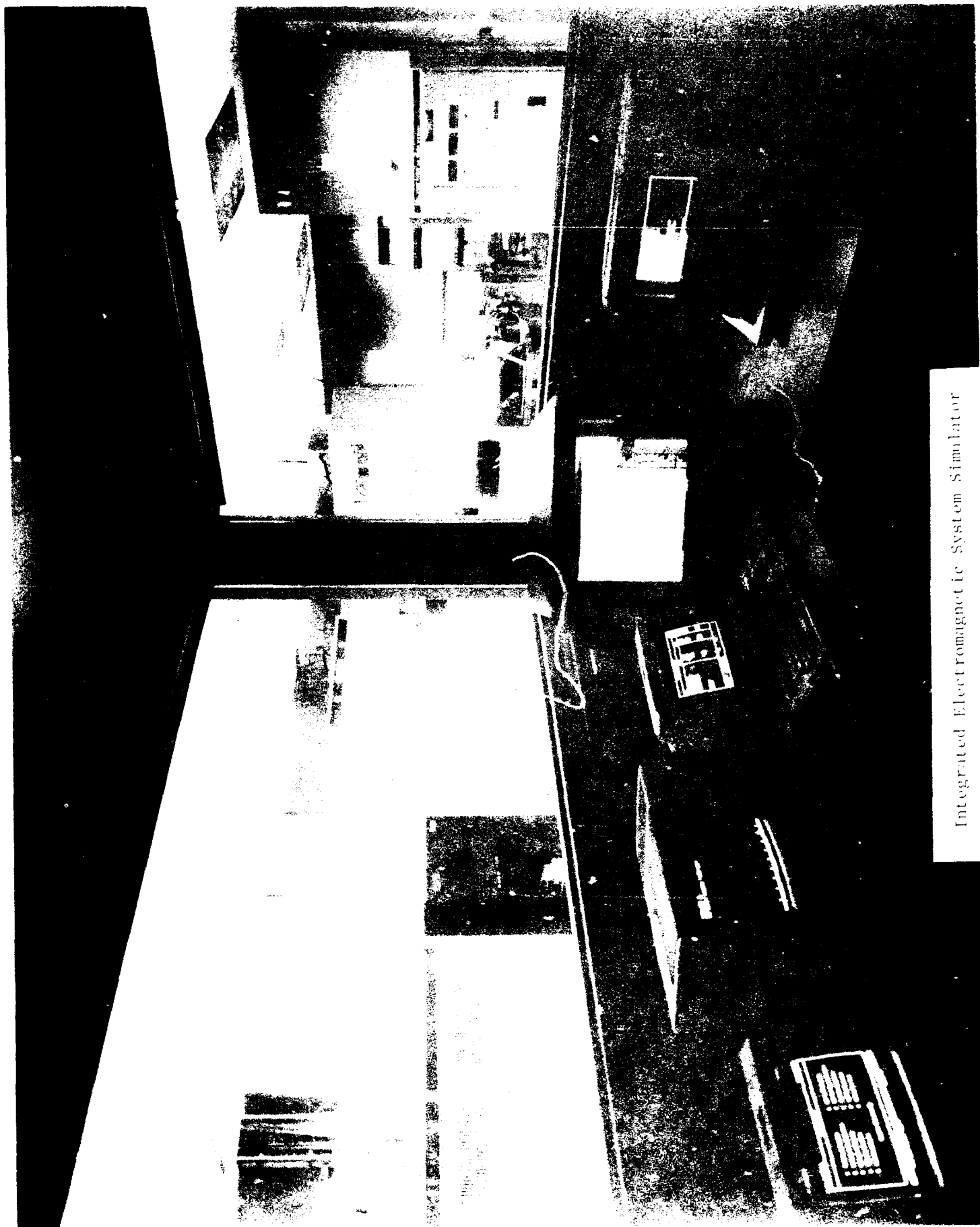
POINT OF CONTACT:

WL/AAAI

WPAFB, OH 45433-6543

(513) 255-2766

DSN 785-2766



FACILITY TYPE:

Laser communications

PURPOSE:

Research, development and testing of ground, airborne, and space based laser communications systems

FACILITY NAME:

Laser Communications Laboratory

PRIMARY CAPABILITIES:

Atmospheric Turbulence, LASER Characterization, Spectral Characterization of Transparent Materials and System Reliability testing

Lasercom link as an adaptive system

SPECIAL/UNIQUE CAPABILITIES:

Real-time measurement of atmospheric conditions to include temperature, pressure, humidity, and diffraction-limited aperture of the atmosphere

Eight inch telescope interfaced with optical detection equipment and MicroVAX for use as a generic optical antenna/receiver in lasercom link analysis system

Optical wavefront/coherence analysis system interfaced with MicroVAX for laser beam wavefront characterization

INSTRUMENTATION:

EGG-555 Spectral radiometer capable of wavelength measurements (UV through IR), Photodyne Radiometer, Optical wavefront/coherence analysis system

Eight inch telescope, MicroVAX workstation interfaced with IEEE-488 Data Bus for use as data acquisition equipment

Software for design/analysis of optical systems: Evaluating laser hazards, evaluation/simulation of atmospheric modeling

AVAILABILITY:

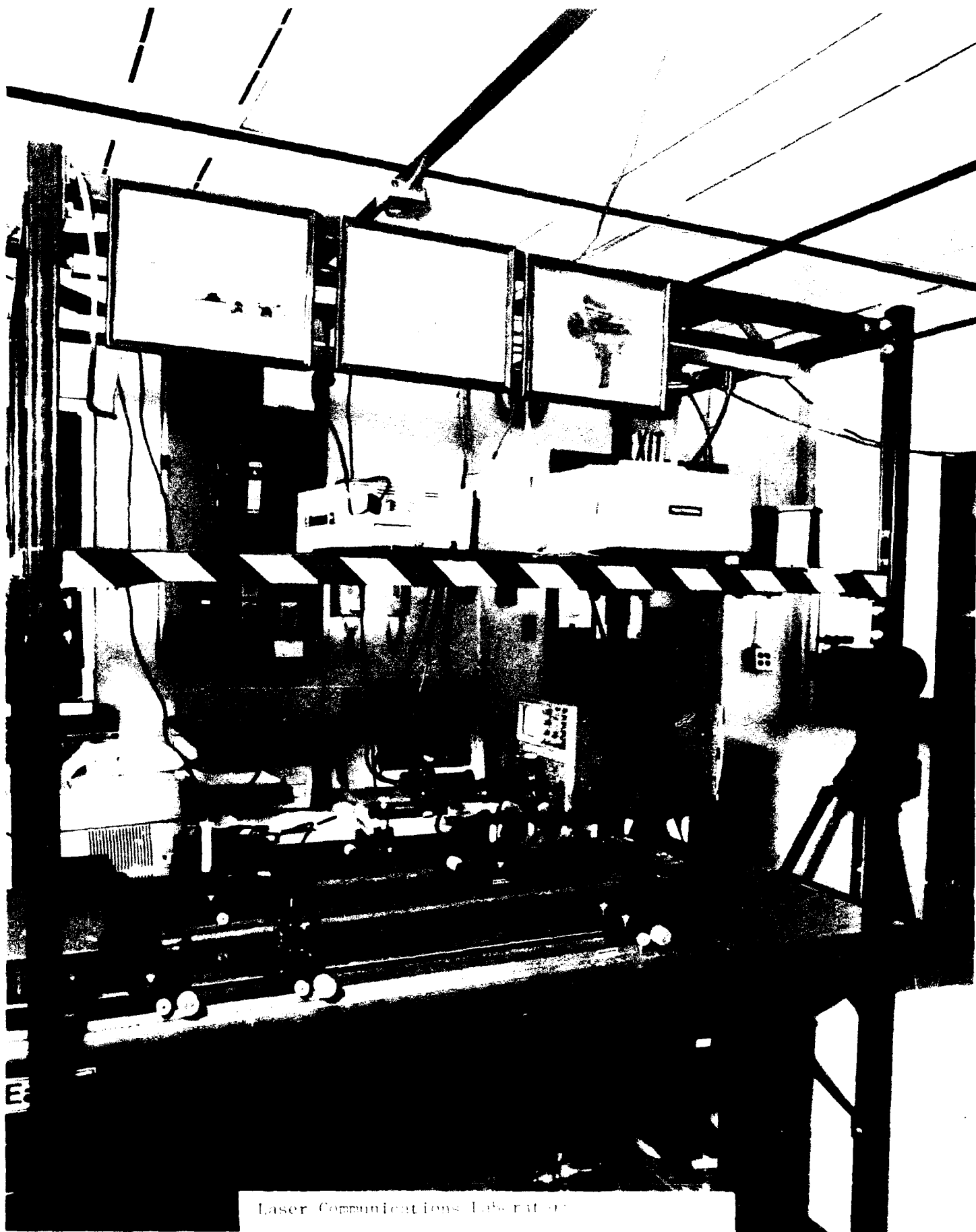
Primarily In-House, available to government agencies within DOD

LOCATION:

BUILDING: 620 ROOM: 12thFL

POINT OF CONTACT:

WL/AAAI
WPAFB, OH 45433-6543
(513) 255-3455
DSN 785-3455



Laser Communications Laboratory

FACILITY TYPE:

Airborne Satellite Communications Testbed

PURPOSE:

Simulate, test and evaluate experimental satellite communications equipment and systems.

FACILITY NAME:

Satellite Communications Facility

PRIMARY CAPABILITIES:

Transmits to, and receives communications traffic from, satellites

Dependence on link performance on aircraft dynamics, propagation, altitude, antenna tracking mode and timing accuracy

On-orbit satellite anomalies

Terminal/satellite/network protocols, satellite commanding procedures, antenna acquisition and tracking algorithms, coding/interleaving options

SPECIAL/UNIQUE CAPABILITIES:

C-135/372 test bed can be modified to collect data from special shuttle packages/experiments

Measures satellite range, satellite antenna nulling algorithms, uplink/downlink beam registration, jamming susceptibility

INSTRUMENTATION:

UHF, SHF, EHF transmitters, receivers and antennas; modems, i/o transducers, test equipment, modulators, demodulators, various baseband equipment

Inflated radome with ten foot diameter EHF antenna dish with two smaller antennas operable in SHF or EHF bands located on roof of building 620

Antenna pointing - Active track on downlink energy, computer aided passive pointing

AVAILABILITY:

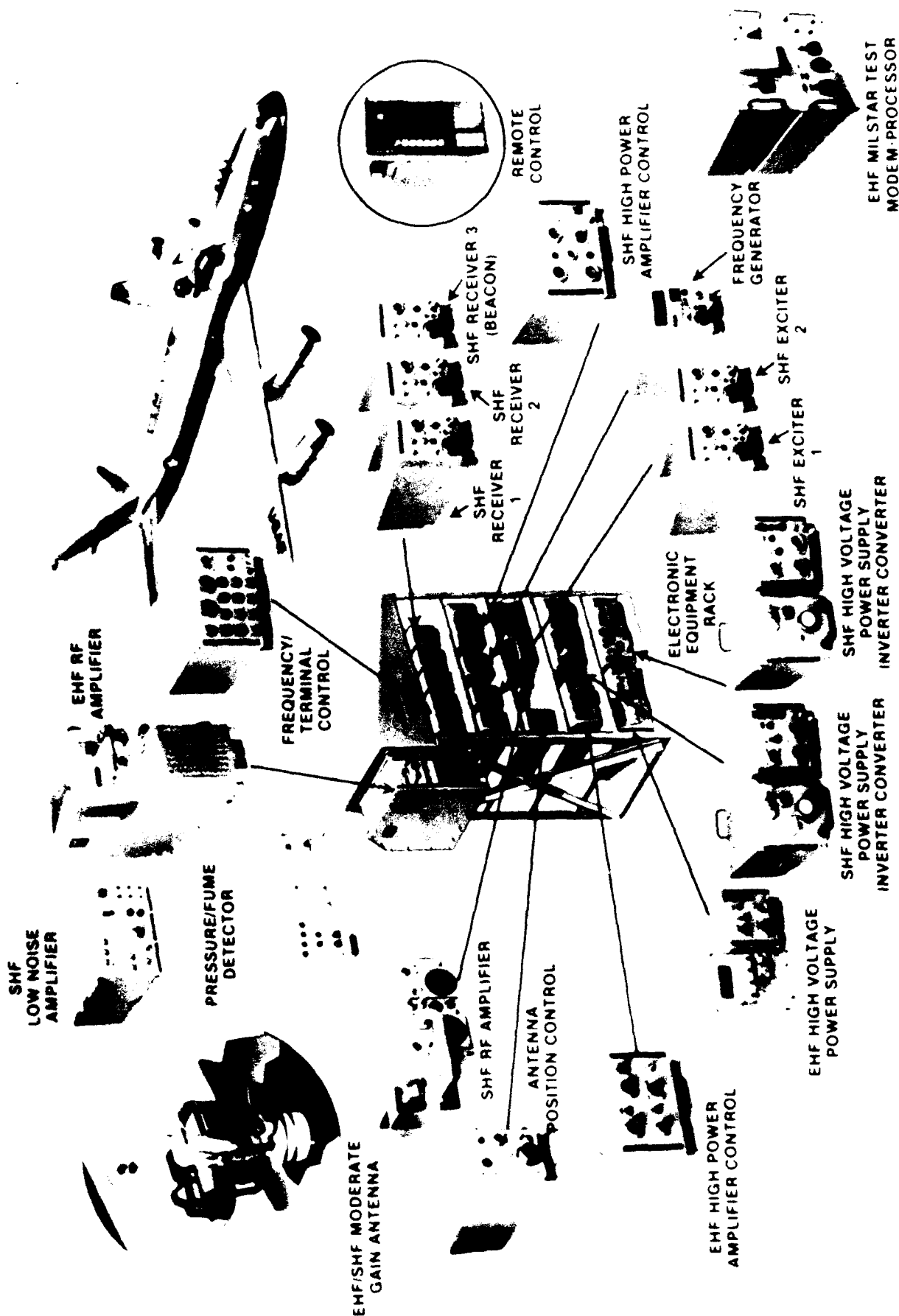
Worldwide availability, available to U.S. government agencies, contractors

LOCATION:

BUILDING: 620 ROOM:

POINT OF CONTACT:

WL/AAAI
WPAFB, OH 45433-6543
(513) 255-2697
DSN 785-2697



FACILITY TYPE:

Avionics Test

PURPOSE:

Test and evaluation of advanced avionics systems, configurations, and subsystems; R&D of advanced avionics systems, architectures, and components

FACILITY NAME:

Integrated Test Bed (ITB)

PRIMARY CAPABILITIES:

Real-time simulation of aircraft performing an operational mission allows evaluation of capabilities across entire spectrum of performance requirements

Provides a direct (non-extrapolated) view of real world problems and considerations

Validation of contract research products in a systems context

SPECIAL/UNIQUE CAPABILITIES:

Real-time simulation/stimulation of avionics interface signals

Generalized Avionics and Simulation/Integration System (GENASIS) software configurable simulated aircraft workstations

Real-time interface to defensive and communication avionics test facilities

INSTRUMENTATION:

Avionics flight processors with Ada operational flight programs and the avionics multiplex and fiber optic data buses

Models set include multiple aircraft, sensors, weapons and external environment modules; VAX11/785/non-real-time development environment

GENASIS modular cockpit with six-nine inch diagonal color displays coupled with F-15 type stick and throttle, moving map display, fiber optics communications

AVAILABILITY:

Primarily in-house research

Limited use by Government contractors

LOCATION:

BUILDING: 620 ROOM: S3N68

POINT OF CONTACT:

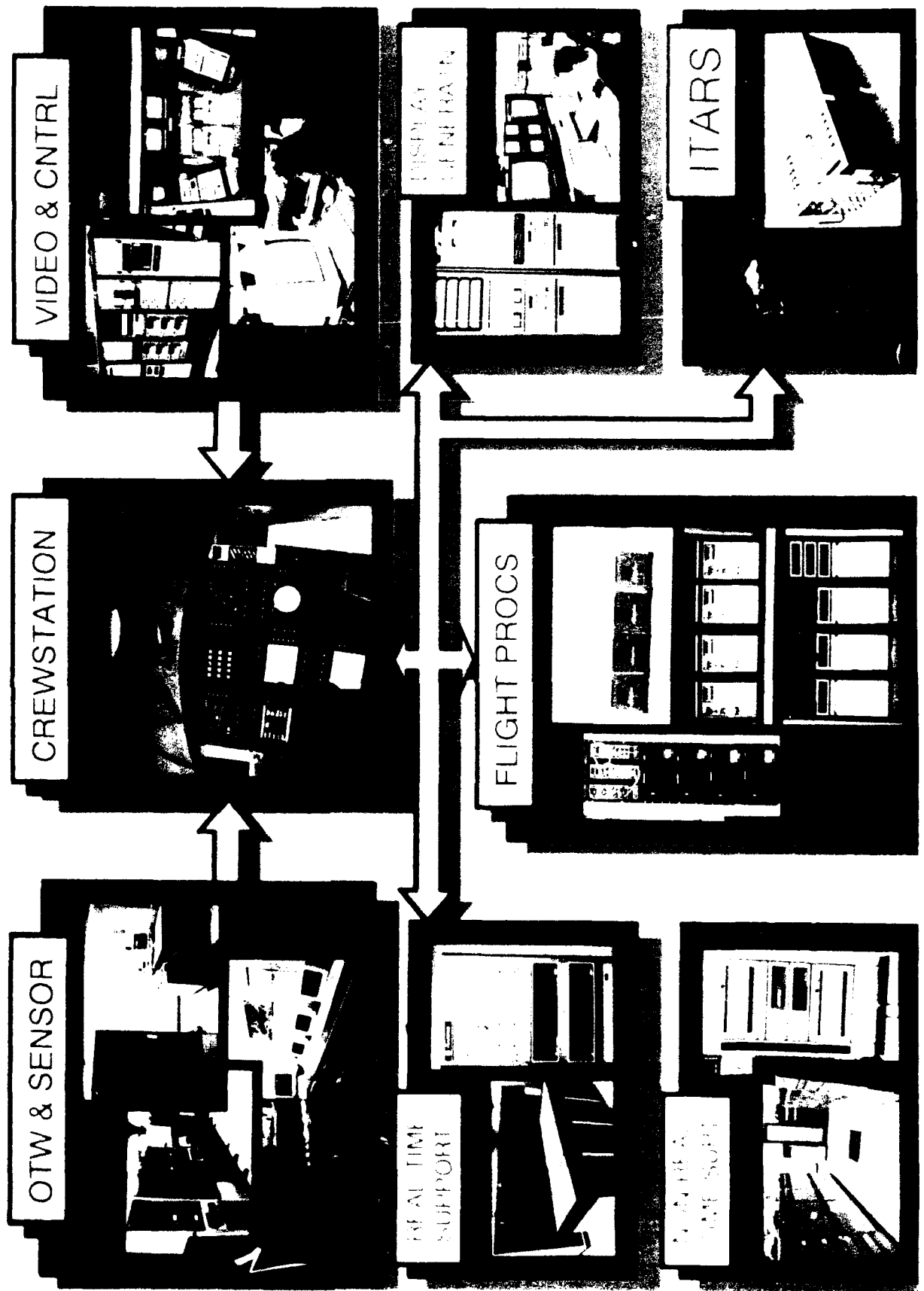
WL/AAAS

WPAFB, OH 45433-6543

(513) 255-4827

DSN 785-4827

INTEGRATED TEST BED



FACILITY TYPE:

Crew Systems Integration

PURPOSE:

Advanced display technology evaluation

FACILITY NAME:

Display Evaluation Laboratory

PRIMARY CAPABILITIES:

Complete display characterization

Spatial and spectral measurements

SPECIAL/UNIQUE CAPABILITIES:

Night Vision Goggle compatible spectroradiometer

INSTRUMENTATION:

Granite optical table

EG&G Gamma Scientific Spectroradiometer

AVAILABILITY:

Available to US Government agencies

Some industry availability

LOCATION:

BUILDING: 146 ROOM: 114

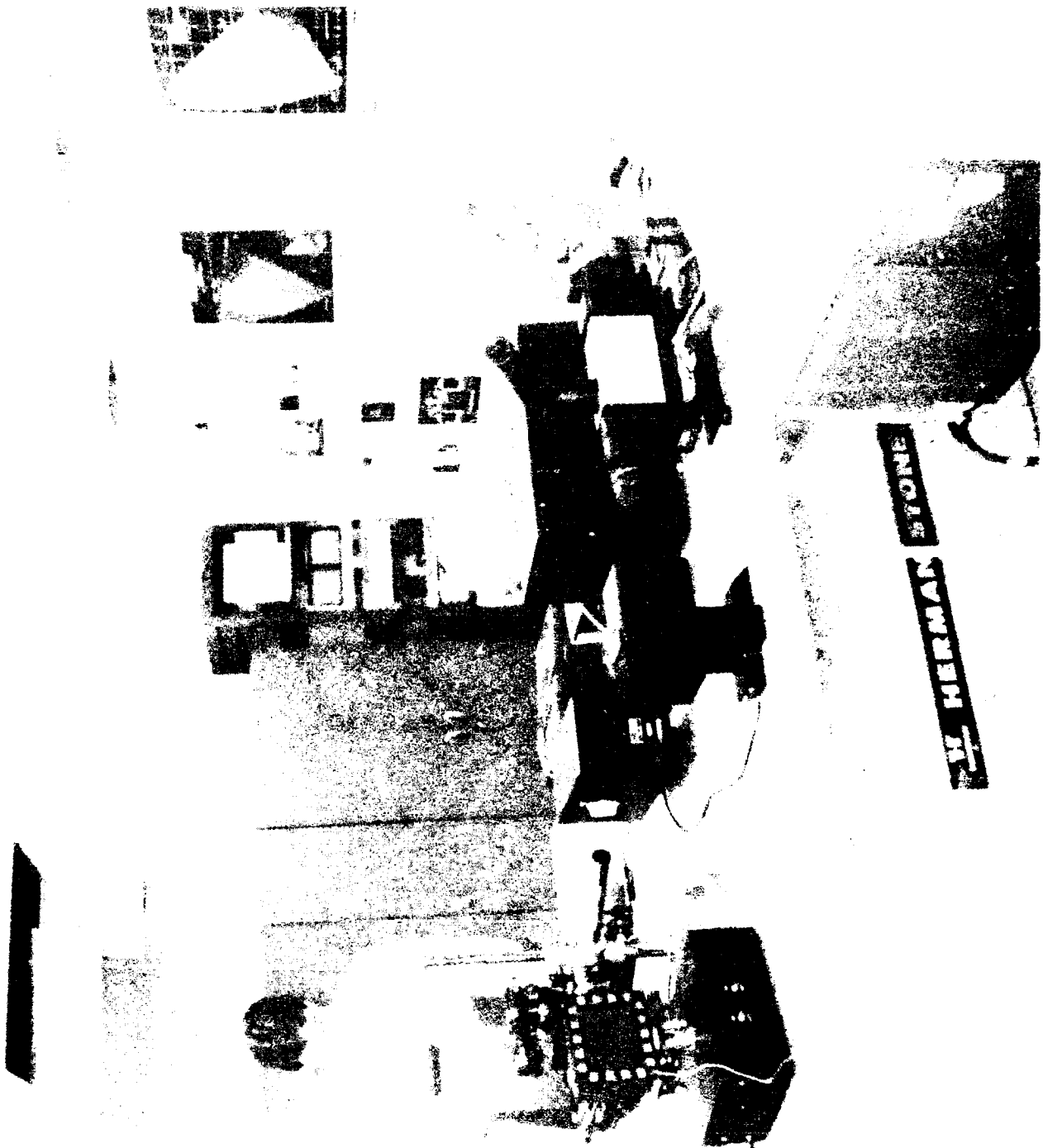
POINT OF CONTACT:

WL/AAAT

WPAFB, OH 45433-6553

(513) 255-8261

DSN 785-8261



Display Evaluation Laboratory

FACILITY TYPE:

Information Processing

PURPOSE:

Development of signal and data processing and machine intelligence paradigms and architectures to provide real-time information processing of avionics systems

FACILITY NAME:

Information Processing Laboratory

PRIMARY CAPABILITIES:

Research, development and evaluation of machine intelligence paradigms and advanced processor architectures

SPECIAL/UNIQUE CAPABILITIES:**INSTRUMENTATION:**

Three microvaxs, Sun IV workstation with 16 transputers, Dec 5000/200 workstation,

MIPS Magnum 2000 computer, Sanders Star computer, and two IBM compatible 486 computers

Located in rooms S3M37 and S3M43 of building 620

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 620 ROOM:

POINT OF CONTACT:

WL/AAAT

WPAFB, OH 45433-6543

(513) 255-4949

DSN 785-4949



187

187

187

FACILITY TYPE:

Laboratory and Flight Instrumentation

PURPOSE:

Provide instrumentation/data collection for lab sensor/system evaluations; specialized flight instrumentation to define aircraft & sensor environment

FACILITY NAME:

Instrumentation Laboratory

PRIMARY CAPABILITIES:

Instrumentation and measurement capability covers parameters of pressure, thermal, dynamics, acoustics, optics, and recording

Measures unique data related to sensor, aircraft and environment operation and conditions

Supports all types of environmental tests including flight measurements to define flight environments and complete sensor/system flight demo and eval tests

Over 1400 line items of instrumentation equipment available

SPECIAL/UNIQUE CAPABILITIES:

Fabrication of special test and measurement instrumentation to support unique laboratory and flight test evaluations

Airborne flight packages to collect required data to establish sensor/system performance; complete battery operated instrumentation packages available

Standard and miniaturized instrumentation available; test teams and equipment deployable for total data reduction between flights

INSTRUMENTATION:

Complete instrumentation capability to support diverse laboratory analysis and evaluations, and simultaneous flight measurement programs

Located in buildings 18F and 23

AVAILABILITY:

Reimbursement organization; maintains "Quick Reaction Capability"

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/AARF
WPAFB, OH 45433-6543
(513) 255-5406
DSN 785-5406



Instrumentation Laboratory

FACILITY TYPE:

Vibration

PURPOSE:

Analyze and solve difficult mechanical dynamics problems

FACILITY NAME:

Modal Analysis System

PRIMARY CAPABILITIES:

Determine resonant frequencies, mode shapes and damping values experimentally on mechanical structures

Evaluate effects that changes in damping, stiffness, and/or mass will have on a structure

SPECIAL/UNIQUE CAPABILITIES:

Ling Model B335 shaker with Dynamics amplifier drivers: force rating-9000lb (with growth potential to 18000lb); useful frequency range 5HZ to 2000HZ;

(cont) multiple input, burst random excitation technique; multiple degree of freedom analysis

INSTRUMENTATION:

16 channel GENRAD 2515 analyzer with SRDC MODALPLUS software; 4 channel Ono Sokki 9600 analyzer with SMS starmodal software

3 VTS 70lbf vibrations shakers, PCB force transducers, accelerometers, and burst random excitation techniques

Excitation equipment including equipment to do impact hammer and burst random excitation techniques

AVAILABILITY:

Primarily in-house

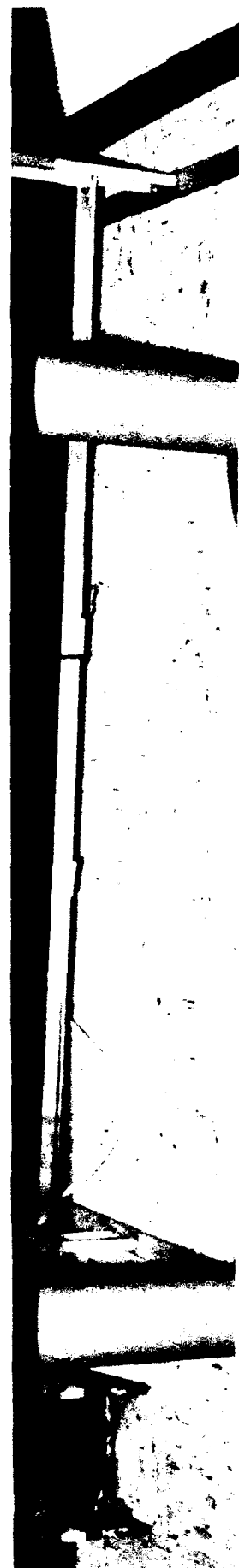
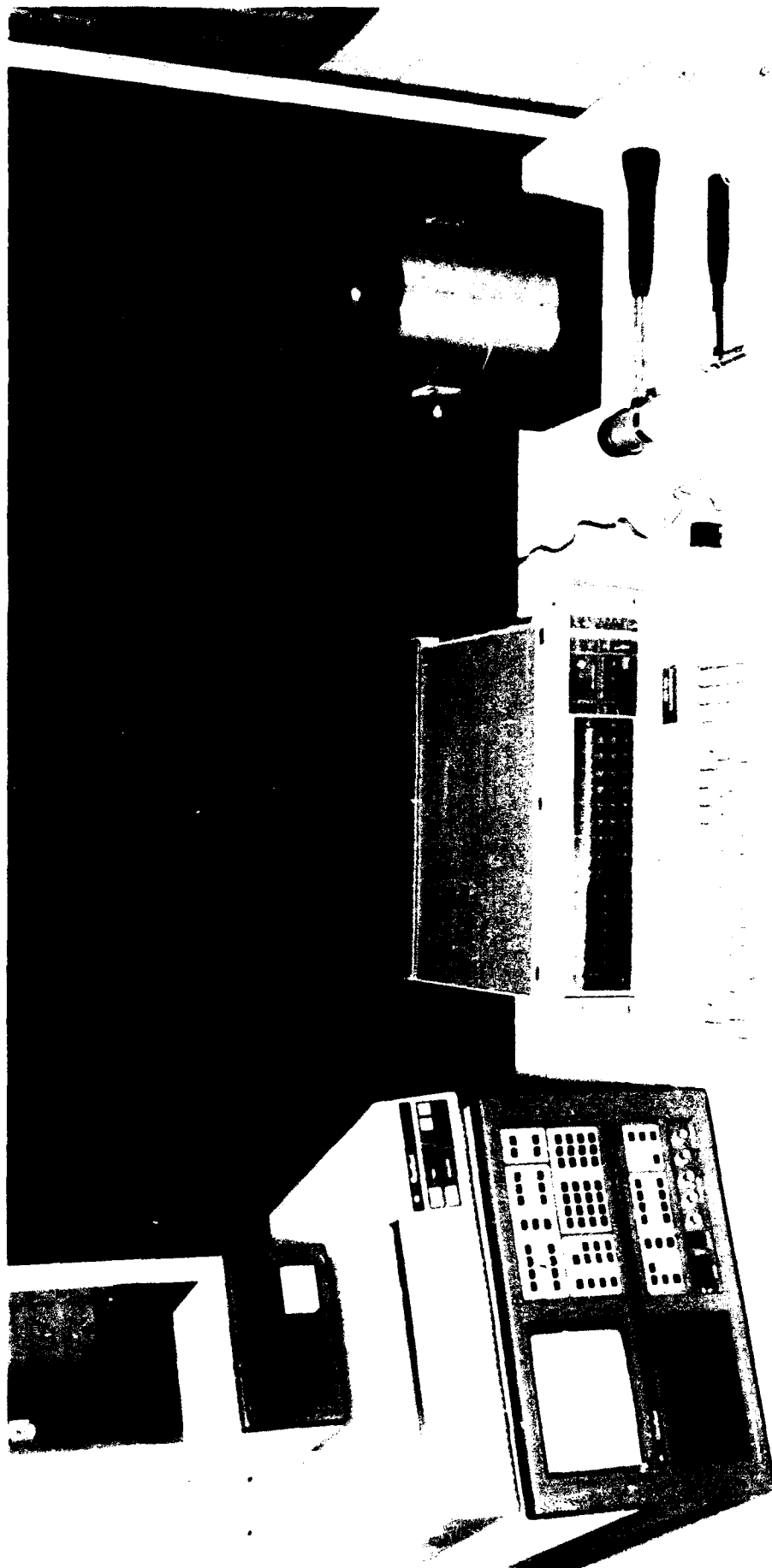
Located in buildings 18F and 23

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/AARF
WPAFB, OH 45433-6543
(513) 255-5263
DSN 785-5263



Modal Analysis System

FACILITY TYPE:

Sensor Update and Modification

PURPOSE:

To modify and refurbish sensor systems

FACILITY NAME:

Photo Optics Modification Center

PRIMARY CAPABILITIES:

Update all optical camera systems

Modify sensors to meet new mission requirements

Upgrade sensors with the newly available technology

SPECIAL/UNIQUE CAPABILITIES:

CAD/CAM system available to design and fabricate printed circuit boards; prototyping readily achievable within a day

Mechanical and electrical modification capability

INSTRUMENTATION:

Located in buildings 23 and 18F

AVAILABILITY:

Reimbursement organization; maintains "Quick Reaction Capability"

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/AARF

WPAFB, OH 43433-6543

(513) 255-5406

DSN 785-5406

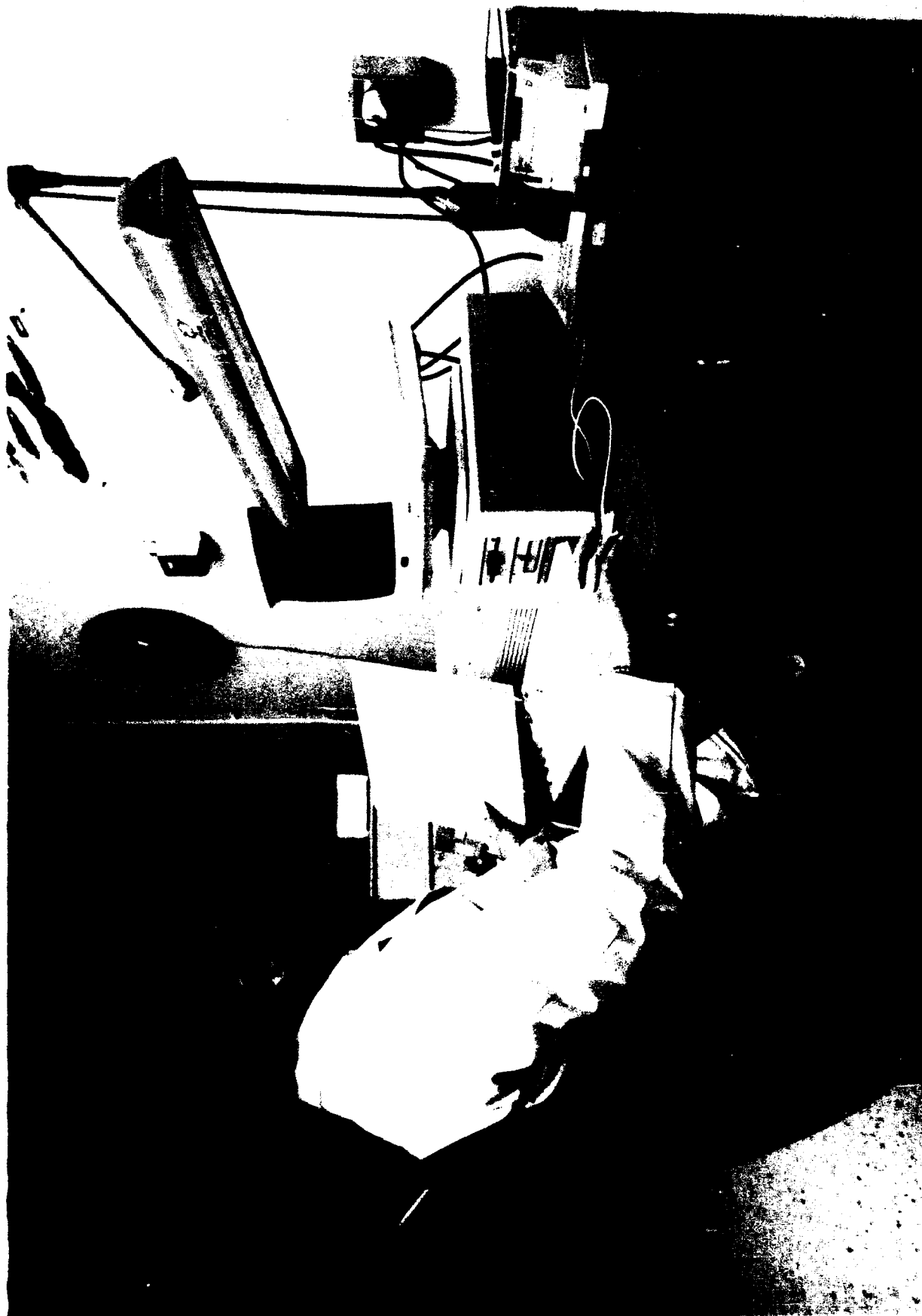


Photo Optics Modification Center

FACILITY TYPE:

Physical sensor/system flight simulation

PURPOSE:

Evaluate the design integrity and performance of R&D and operational avionics, and sensor/systems under simulated flight conditions

FACILITY NAME:

Sensor/System Dynamic Analyzer (DA)

PRIMARY CAPABILITIES:

Facility flexibility permits continual updating to include future advances in testing technology, methods, and equipment

Can subject test items to conditions of temperature, altitude, 3-D vibration, roll, pitch and yaw, and angular rates and air flow

Useable test space: equipment frame-rectangular: 6' dia x 8'L or 10'L; round: 6' dia x 12'L with additional 4' dia x 3'L at each end

SPECIAL/UNIQUE CAPABILITIES:

Simultaneous controlled visual, EO, and IR target environments during simulation; 20' collimator all reflective optics w/24" dia aperture; other collimators avail.

Simulated ground motion of target under variable controlled target conditions

Multiple set-up rooms, wide latitude installation and test capability, less than one hour DA installation or removal

INSTRUMENTATION:

Computer controlled with manual options, any single or combined environments, thermal recording 200 channels

Full data collection/processing capability

Located in buildings 23 and 18F

AVAILABILITY:

A reimbursement facility

Primarily in-house, available to U.S. Gov't agencies

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/AARF

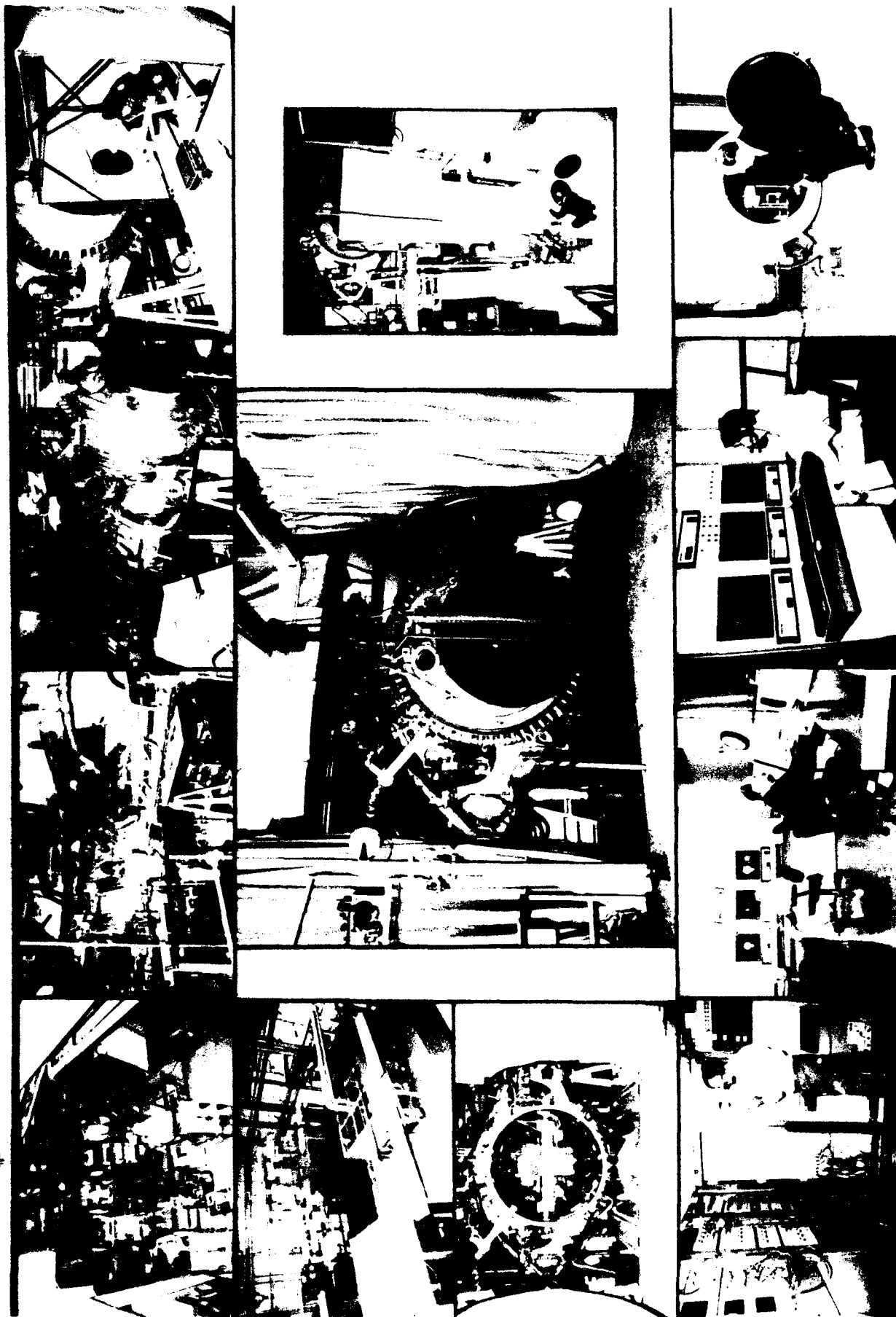
WPAFB, OH 45433-6543

(513) 255-5406

DSN 785-5406



UPDATED DYNAMIC ANALYZER



FACILITY TYPE:

Image evaluation and analysis

PURPOSE:

Analyze sensor system performance in use with automatic target acquisition technologies; measure and evaluate output and correlate with acquisition conditions

FACILITY NAME:

Sensor Quality Analysis Laboratories (SEQAL I and II)

PRIMARY CAPABILITIES:

Quantitative analysis of sensed data using automatic data processing equipment and software programs algorithms

Qualitative analysis of sensed data using trained image analysts and softcopy image processing equipment and displays

Analyze sensor systems performance using computer modeling and simulations and/or analysts' assessment of data quality and characteristics

SPECIAL/UNIQUE CAPABILITIES:

Ability to analyze and process all levels of classified data and sensors to include special access and compartmented systems

INSTRUMENTATION:

11/785 VAX computers, image digitizer (EIKONIX 785), image processor (DEANZA IP8500), high bit rate recorder (AMPEX DCRS)

Workstations (SUN 3, SUN 4, SUN SPARCSTATION), PCs

Located in buildings 23 and 18F

AVAILABILITY:

Available to all government agencies

A reimbursement facility

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/AARF

WPAFB, OH 45433-6543

(513) 255-6329

DSN 785-6329



SEQAL I and II

FACILITY TYPE:

Electro-optical (EO) Sensors

PURPOSE:

Simulate air-to-ground environment for evaluation of EO targeting and navigation sensors

FACILITY NAME:

EO Sensors Evaluation Range

PRIMARY CAPABILITIES:

Develop/validate sensor performance models

Test passives countermeasure effectiveness

Evaluate operational and developmental EO sensor technology

SPECIAL/UNIQUE CAPABILITIES:

300 ft sensor platform

Optical link to EO sensor evaluation lab for real-time sensor analysis

Wright Field Test Range (Trebein Reservation) containing visual and infrared Targets

INSTRUMENTATION:

Fixed and portable meteorological stations

Fixed and portable EO signature (radiometric) measurement system

Fixed system and portable atmospheric transmission measurement systems

AVAILABILITY:

Available to U.S. Government agencies

LOCATION:

BUILDING: 620 ROOM: Tower

POINT OF CONTACT:

WL/AARI

WPAFB, OH 45433-6543

(513) 255-9609

DSN 785-9600

EO SENSOR EVALUATION/ANALYSIS GROUP



FACILITY TYPE:

Electro-Optical Sensors

PURPOSE:

Characterize both in the laboratory and in the field (via recordings) state-of-the-art electro-optical imaging sensor systems

FACILITY NAME:

Infrared Laboratory

PRIMARY CAPABILITIES:

Provide data for system-to-system comparisons, input to models, development feedback, calibrations, technique development, and acceptance testing

SPECIAL/UNIQUE CAPABILITIES:

Receive (in Bldg 620) real time or recorded video signals from sensors undergoing field evaluations

Analyze flight test data

INSTRUMENTATION:

Infrared collimator/targets/sources

Image processing system

AVAILABILITY:

Available to US government agencies

LOCATION:

BUILDING: 622 ROOM: 127

POINT OF CONTACT:

WL/AARI

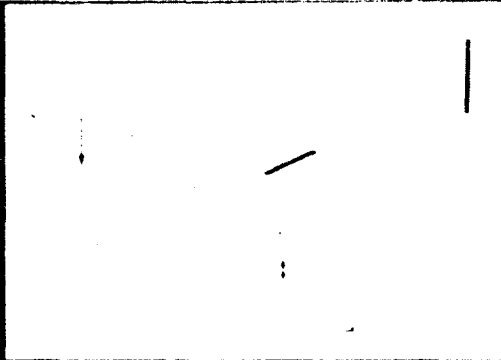
WPAFB, OH 45433-6543

(513) 255-9615

DSN 785-9615

INFRARED SENSOR CHARACTERIZATION

LABORATORY SET-UP



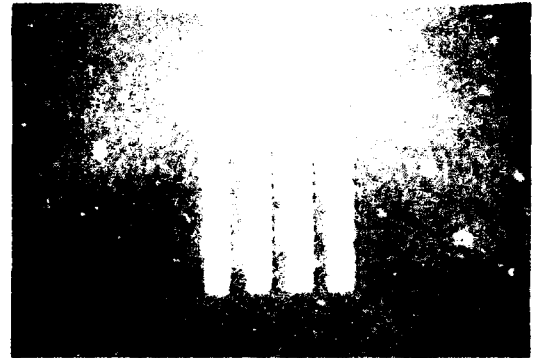
LABORATORY FACILITY



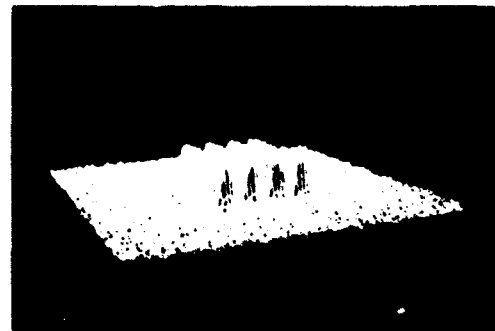
SENSOR TESTS

- **Signal and Noise**
 - Delta Signal, Signal-to-Noise, NEDT, Gain
- **Modulation Transfer Function (MTF)**
 - One and Two Dimensional
 - Square Wave Response
- **Uniformity**
 - Standard deviation, noise power spectrum, hist
- **Minimum Resolvable Temperature**
 - Observer and Computerized
- **Distortion**
- **Time Base Error (Jitter)**
- **Blooming**
- **Dead or Improperly Sequenced Scan Lines**
- **Spectral Response**

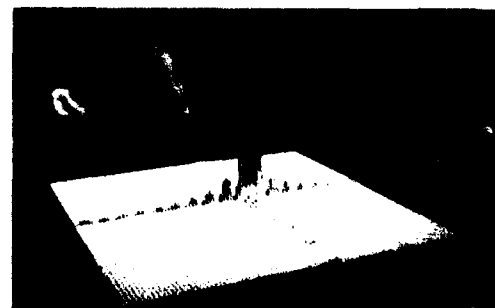
FOUR BAR TEST PATTERN



FOUR BAR INTENSITY PLOT



FOUR BAR FOURIER TRANSFORM



FACILITY TYPE:

Laser radar systems

PURPOSE:

Research, test and develop high-performance solid state laser radar and component technology

FACILITY NAME:

Laser Radar Research Lab (LADAR)

PRIMARY CAPABILITIES:

Development of new system integration technologies of laser radar systems

Can perform heterodyne detection and fiber optic mixing

SPECIAL/UNIQUE CAPABILITIES:

Uses non-mechanical beam agility device

Combines beam agility devices in the receiver portion of the laser radar system

INSTRUMENTATION:

Solid state 1.06um Nd:YAg laser, consto-optic modulator, InGaAs detector, Faraday isolator, fiber couplers, digital oscilloscope

Two beam agility devices using liquid crystal phased-array technology

One beam agility device using phase grating concept using acousto-optic deflector modules

AVAILABILITY:

Available to U.S. government agencies, contractors and industry for DOD projects

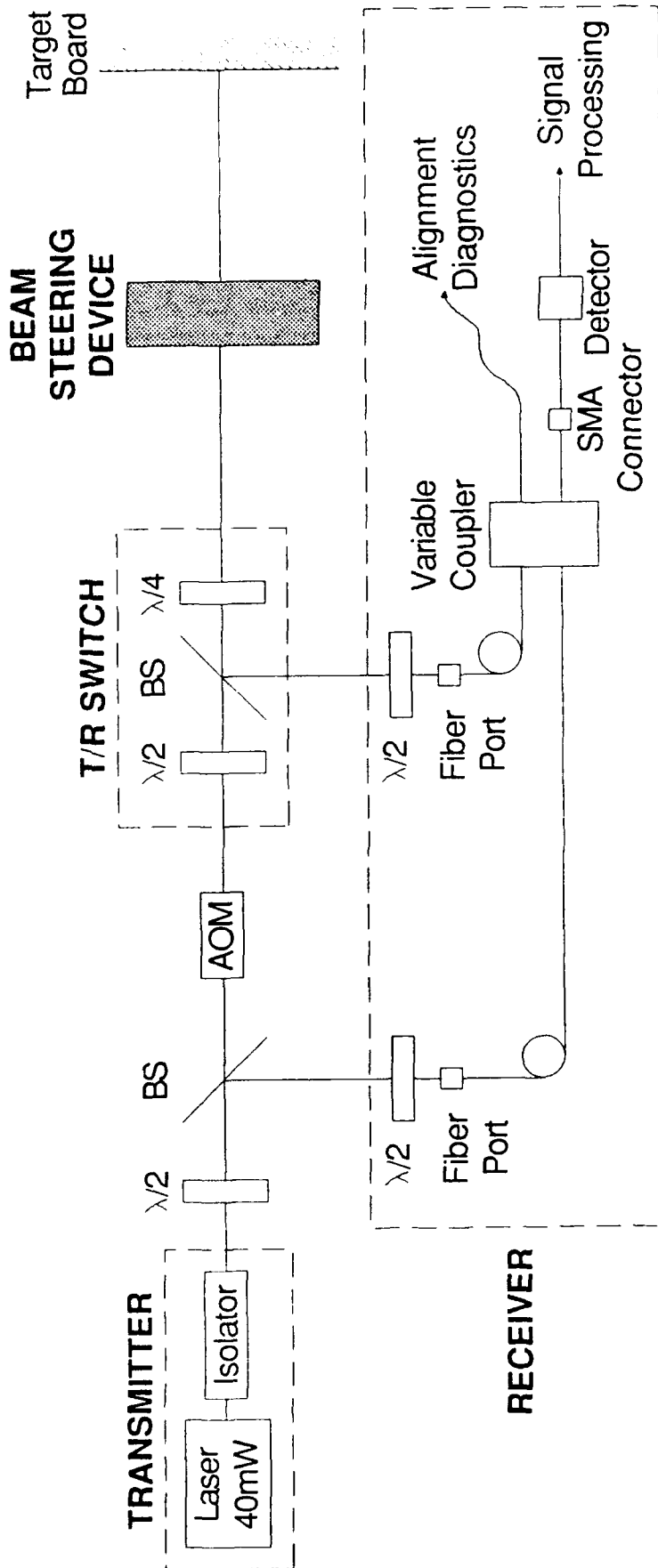
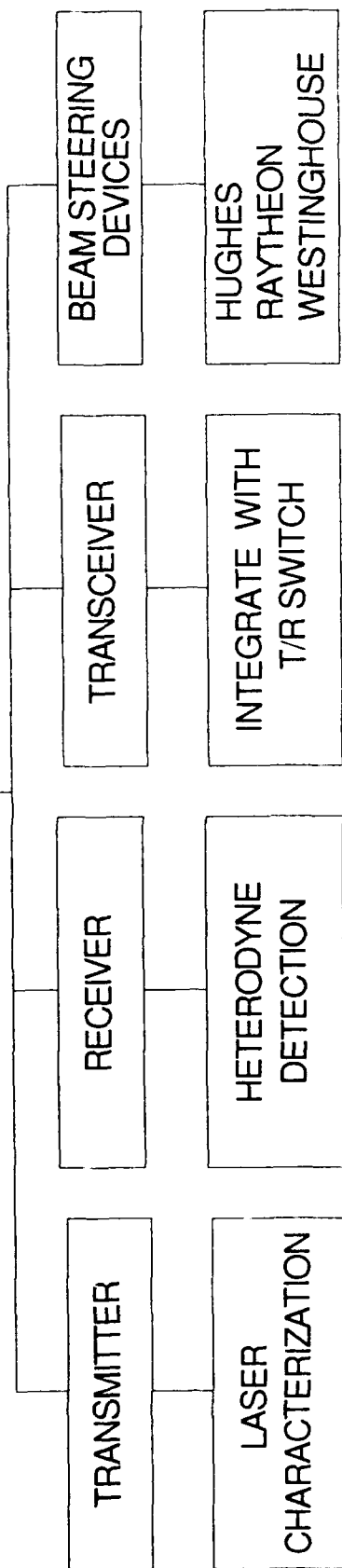
LOCATION:

BUILDING: 622 ROOM: 111

POINT OF CONTACT:

WL/AARI
WPAFB, OH 45433-6543
(513) 255-9615
DSN 785-9615

CREOLE (ILIR)



FACILITY TYPE:

Electro-optical systems

PURPOSE:

Research, test, and analysis of electro-optical systems under simulated environmental conditions

FACILITY NAME:

Optical Radar Research Facility

PRIMARY CAPABILITIES:

Can measure far-field patterns of large antenna systems under controlled temperature and pressure conditions

Can conduct research investigations on large diameter optics and optical systems

SPECIAL/UNIQUE CAPABILITIES:

Test optical antennas up to 2.4 meters in diameter

Simulate altitudes up to 270,000 feet

INSTRUMENTATION:

Seismometers; 32-channel data logger, 8-channel digital chart recorder, PC based computer system

100 inch collimator in a vacuum chamber to test, evaluate and analyze electro-optical sensors under controlled temperature and pressure conditions

Primary mirror with focal length of 600 inches, alternate focal lengths of 1200 or 2000 inches

AVAILABILITY:

Available to U.S. government agencies, contractors and industry for DOD projects

LOCATION:

BUILDING: 622 ROOM: 128

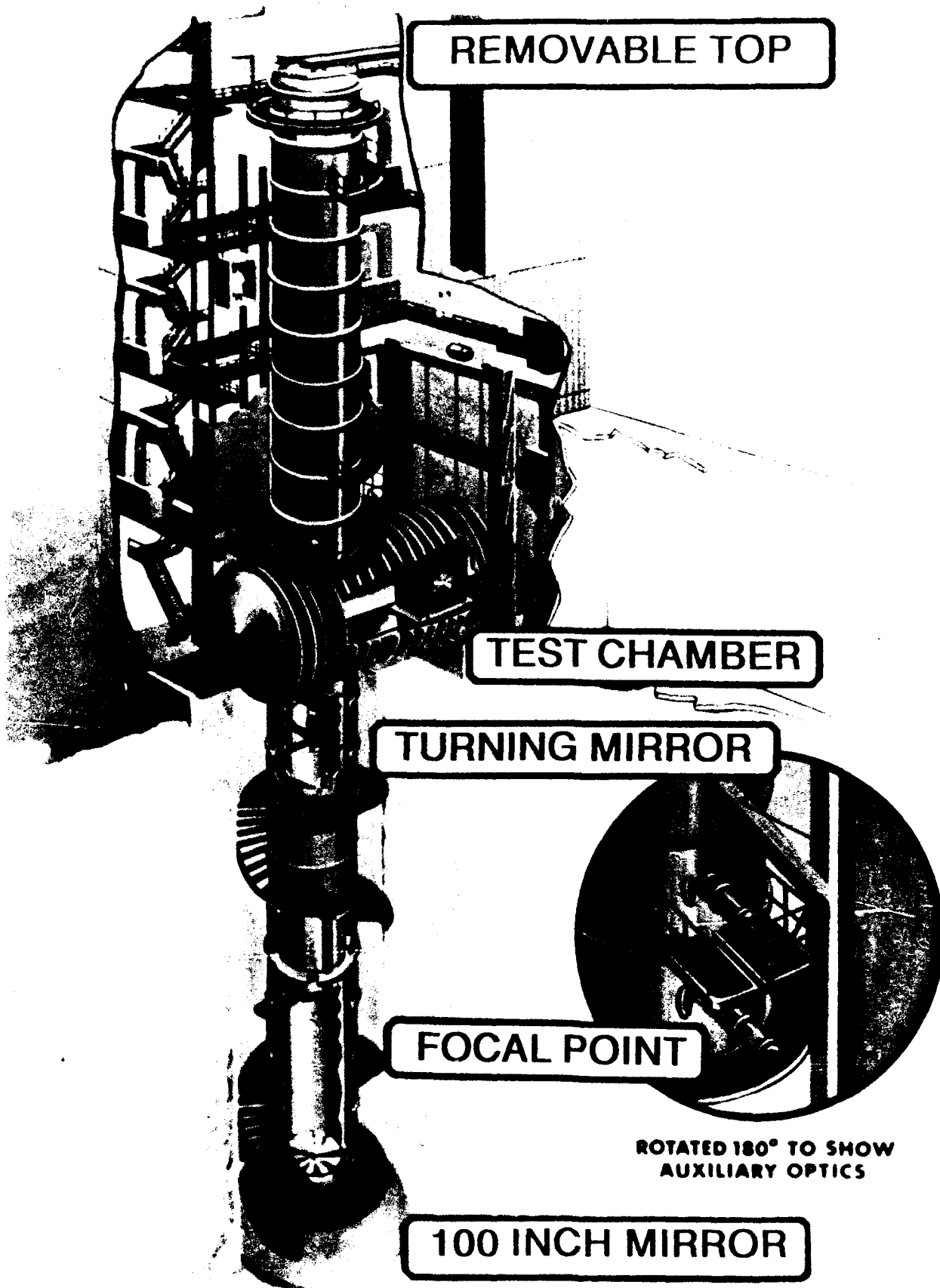
POINT OF CONTACT:

WL/AARI

WPAFB, OH 45433-6543

(513) 255-9615

DSN 785-9615



Optical Radar Research Facility

FACILITY TYPE:

Optical research

PURPOSE:

Test and characterize novel optical components and devices for use in laser radar systems

FACILITY NAME:

Optical Research Laboratory

PRIMARY CAPABILITIES:

Ability to predict system performance through optical component evaluation, quantify device limitations, provide feedback to contractors

SPECIAL/UNIQUE CAPABILITIES:

Vibration isolated collimator

Capability to test and characterize laser beam steering devices

INSTRUMENTATION:

Illumination analyzer which provides a method of measuring the transmittance of optical assemblies with a collimated light source

Integrating sphere with a photomultiplier detector, 386-based image and signal processors, silicon and pyroelectric detection systems

240 inch EFL vibration isolated collimator with high precision optical test bench, 14' collimator, laser unequal path interferometer, various lasers

AVAILABILITY:

US Government agencies and their contractors

LOCATION:

BUILDING: 622 ROOM: 118

POINT OF CONTACT:

WL/AARI

WPAFB, OH 45433-6543

(513) 255-9614

DSN 785-9614



Optical Research Laboratory

FACILITY TYPE:

Fire control simulation

PURPOSE:

Process engineering analysis of fire control system performance, develop fire control algorithms, determine sensor performance requirements

FACILITY NAME:

Fire Control Simulation Facility (FICSIM)

PRIMARY CAPABILITIES:

Analysis of fire control system performance in air-to-air arena(AASPEM), air-to-ground arena (MACE and MULTACK), and space-to-space (SDISEM) arena

Detailed modeling of radar sensors with AIRADE program, electro-optic sensors in the EOSIM model

Data reduction using PV~Wave or Dataplot programs

Subroutine packs: Numerical Algorithm Group (NAG), Precision Visuals Inc. (PVI) graphics, and Basic Astrodynamics (BASTRO) subroutines

SPECIAL/UNIQUE CAPABILITIES:

Have both classified and unclassified fire control simulation processing capability

INSTRUMENTATION:

Workstations (DEC stations, microvax, SPARCSTATION, IRIS 4D, IRIS 3030, PCs)

AVAILABILITY:

Available to U.S. government agencies

LOCATION:

BUILDING: 22 ROOM: H107

POINT OF CONTACT:

WL/AART

WPAFB, OH 45433-6543

(513) 255-3215

DSN 785-3215



FACILITY TYPE:

Radar analysis and signal processing

PURPOSE:

Provide a state of the art modeling, analysis, simulation and signal processing environment for conducting air-to-air and air-to-ground radar system studies

FACILITY NAME:

Radar Analysis and Signal Processing Laboratory (RASPL)

PRIMARY CAPABILITIES:

Determine tradeoffs for optimum airborne system performance in an electronically hostile environment

True non-real-time simulation and analysis utilizing radar systems and radar sub-systems models and threat models

SPECIAL/UNIQUE CAPABILITIES:

Tempest approved facility for up to Secret level simulation, analysis and data processing

Pulse-by-pulse air-to-air and air-to-ground radar system models

INSTRUMENTATION:

VAX 11/785 computer, workstations (VAXstation 3), DEA NZA IP8500 image processors, desktop computers

TU-77 and TU-78 digital tape recorders, remote graphics terminals and PC's

AVAILABILITY:

Primarily in-house research

Limited to some US government agencies

LOCATION:

BUILDING: 22 ROOM: H104

POINT OF CONTACT:

WL/AARM
WPAFB, OH 45433-6543
(513) 255-6071
DSN 785-6071



FACILITY TYPE:

EW environment simulation

PURPOSE:

Test and evaluate radar homing, warning and electronic intelligence receivers

FACILITY NAME:

Dynamic/Combat Electromagnetic Environment Simulator
(DEES/CEESIM)

PRIMARY CAPABILITIES:

Simulate both ground and airborne emitters as seen by a moving penetrator in a realistically dense operating environment

Simultaneously simulate all of the antenna outputs of a typical RWR Array

Used in conjunction with colocated IDAL and EDE to test integrated closed loop, receiver jammer suites in high density environments

SPECIAL/UNIQUE CAPABILITIES:

Interactive capability to "fly" through a threat environment

INSTRUMENTATION:

Manual instrumentation, ALR-46 RWR

Automated environment monitoring and data collection

AVAILABILITY:

Primarily in-house

Available to U.S. Government agencies, industry, government contractors

LOCATION:

BUILDING: 620 ROOM: S1C32

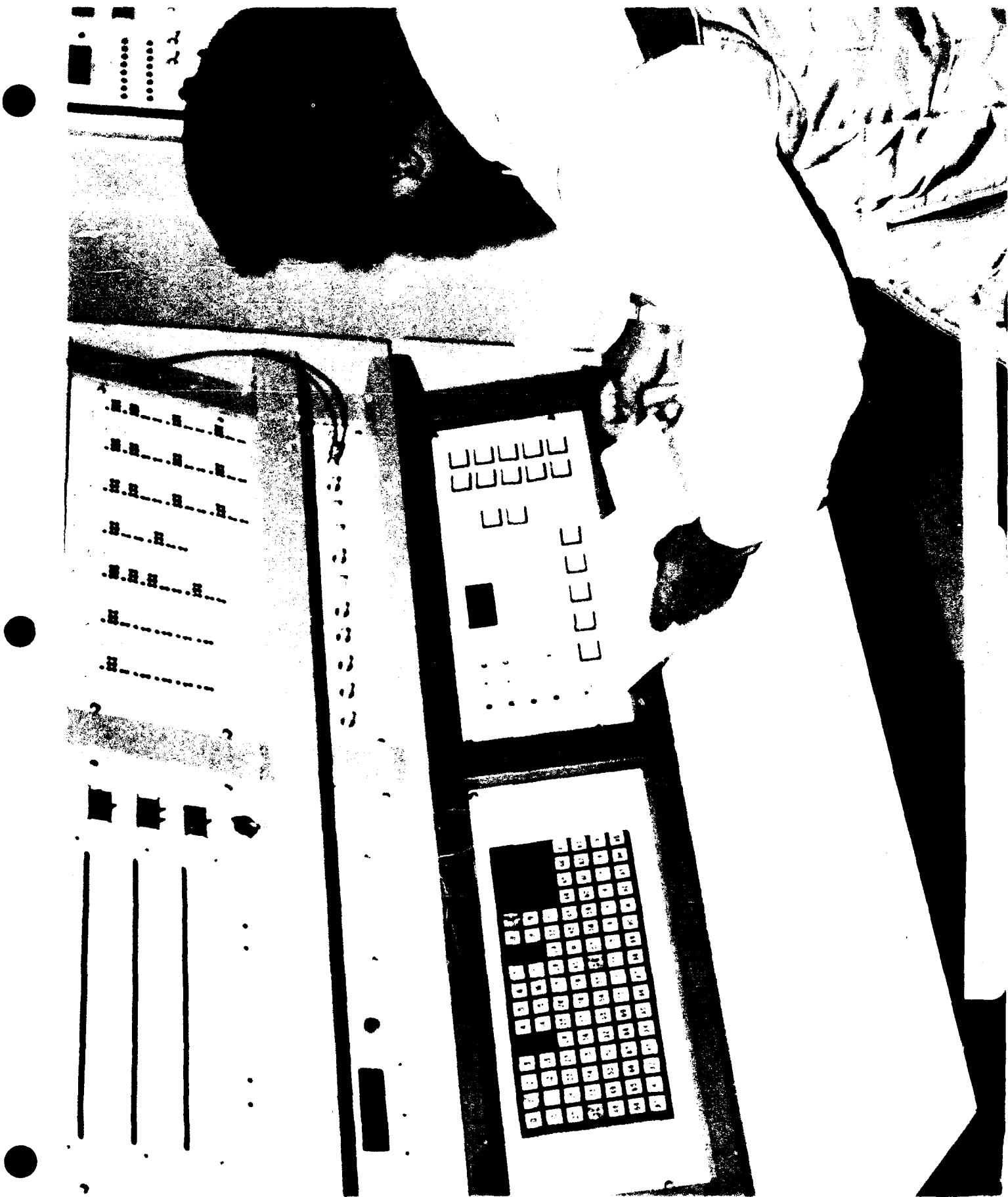
POINT OF CONTACT:

WL/AAWA

WPAFB, OH 45433-6543

(513) 255-4264

DSN 785-4264



FACILITY TYPE:

Electronic combat simulation

PURPOSE:

Develop requirements for electronic combat equipment;
evaluate electronic combat equipment

FACILITY NAME:

Electronic Combat Research Simulation Laboratory (ECSRL)

PRIMARY CAPABILITIES:

Three levels of digital simulation: one-on-one,
one-on-many and campaign level (many-on-many)

SPECIAL/UNIQUE CAPABILITIES:

Classified TEMPEST facility

INSTRUMENTATION:

Electronic and data processing hardware

7500 square foot facility

AVAILABILITY:

Primarily in-house research; Limited use by Government
contractors

Limited U.S. government agency "

LOCATION:

BUILDING: 620 ROOM: 1st FL

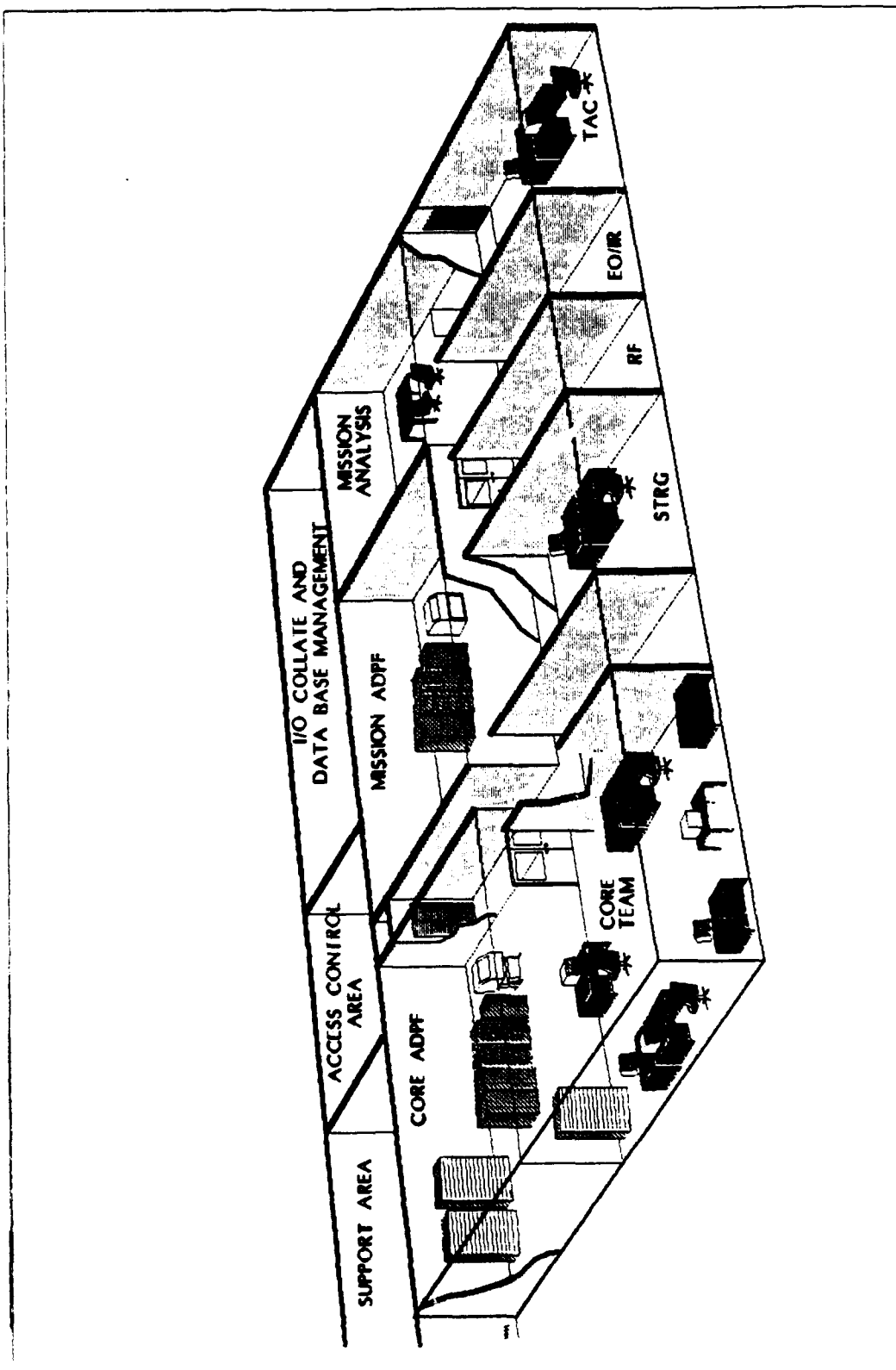
POINT OF CONTACT:

WL/AAWA

WPAFB, OH 45433-6533

(513) 255-4429

DSN 785-4429



Electronic Combat Research Simulation Lab

FACILITY TYPE:

Generic closed loop threat simulator

PURPOSE:

Feasibility test and evaluation of developmental ECM techniques and concepts

FACILITY NAME:

Electronic Defense Evaluator (EDE)

PRIMARY CAPABILITIES:

Simulate tactical, many-on-one engagements between a generic, manned threat radar system (search, acquisition, or track) and penetrating ECM equipped aircraft

Operate on-line with IDAL and DEES/CEESIM to evaluate the responses of automatic ECM systems in high density environments

SPECIAL/UNIQUE CAPABILITIES:

Space-based clutter simulation is available to support satellite survivability testing, chirp radar simulation, and sidelobe blanking and/or cancellation

Phase meter doppler processor implementation

INSTRUMENTATION:

Mainframe computer provides real-time control of signal propagation path modulation factors

Also provides computation of performance factors as well as test data collection

AVAILABILITY:

Primarily in-house

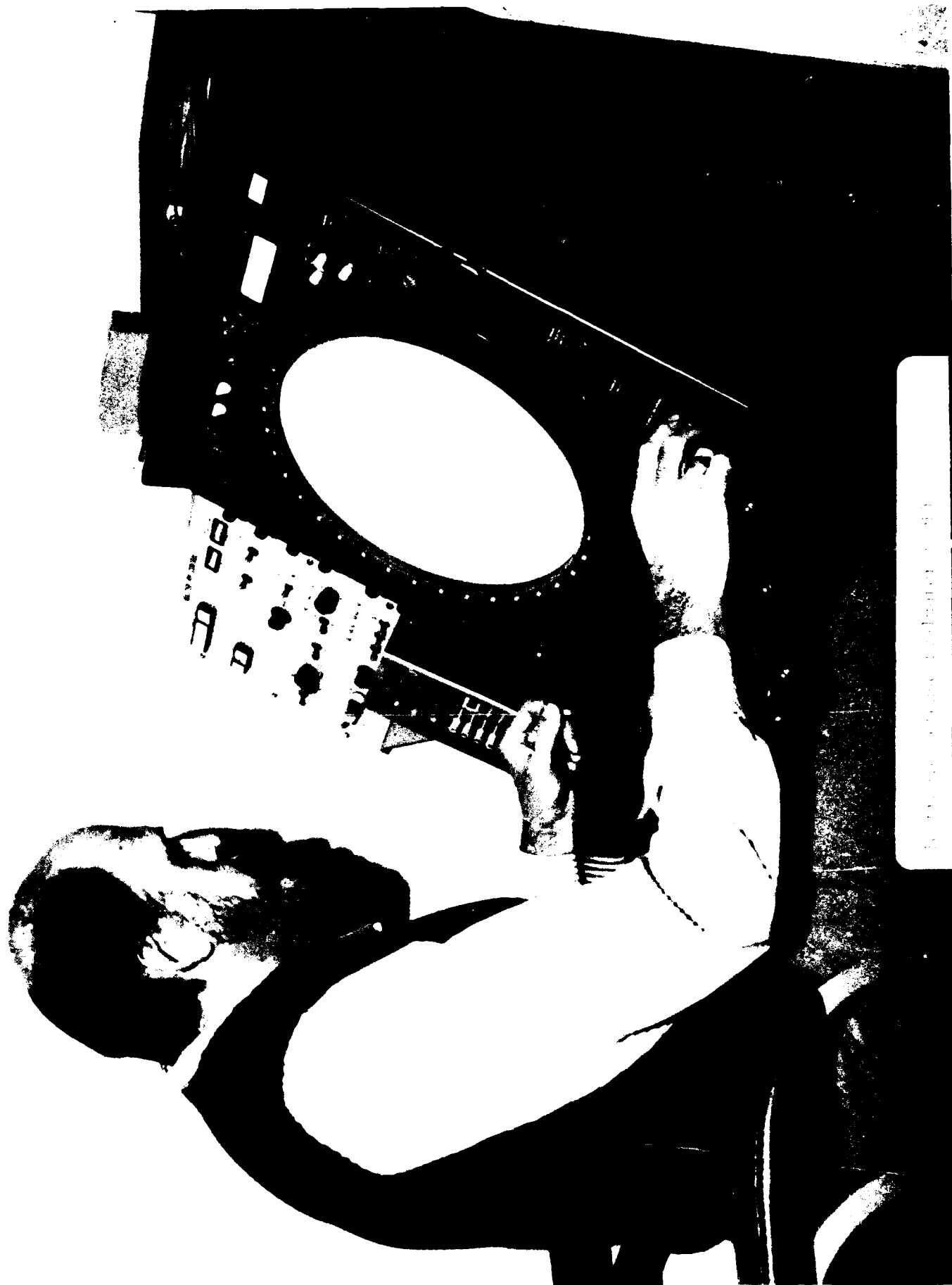
Available to U.S. Government agencies, industry, and government contractors

LOCATION:

BUILDING: 620 ROOM: S1C32

POINT OF CONTACT:

WL/AAWA
WFAFB, OH 45433-6543
(513) 255-4264
DSN 785-4264



FACILITY TYPE:

Hybrid/real-time digital simulation laboratory

PURPOSE:

To conduct integrated EW system/concept evaluation in support of Air Force Exploratory and Advanced Development programs

FACILITY NAME:

Integrated Defensive Avionics Laboratory (IDAL)

PRIMARY CAPABILITIES:

Real-time, interactive, multispectral EW simulation to drive hardware systems or digital emulations

SPECIAL/UNIQUE CAPABILITIES:

Real-time, interactive implementation of SUPPRESSOR command and control model, digital IR/EO scene generator, real-time digital RWR emulation

Interaction with DEES/CEESIM RF environment generators, interaction with Integrated Test Bed cockpit/avionics simulator

Interaction with Electronic Defense Evaluator threat radar simulator

INSTRUMENTATION:

VAX 11/750, Vaxstation 2, Vaxstation 3, Sun 4, CCC3240, CCC3260 MPS

AVAILABILITY:

Primarily in-house, available to U.S. Government agencies

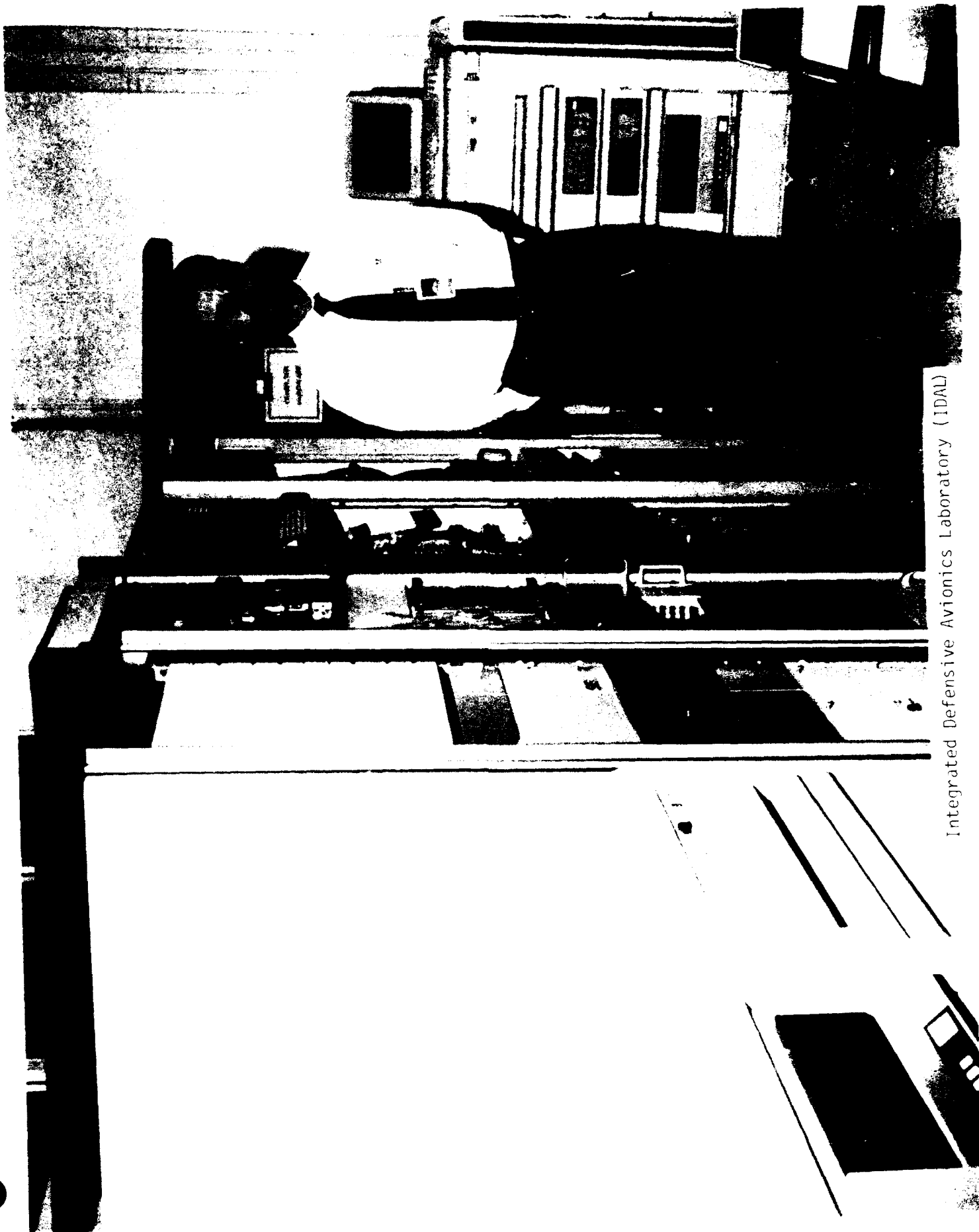
Dedicated to Avionics Lab Exploratory and Advanced Development Programs

LOCATION:

BUILDING: 620 ROOM: S1C32

POINT OF CONTACT:

WL/AWA
WPAFB, OH 45433-6543
(513) 255-4429
DSN 785-4429



Integrated Defensive Avionics Laboratory (IDAL)

FACILITY TYPE:

E-O Devices

PURPOSE:

Test and evaluate IR and laser warning receivers

FACILITY NAME:

Electro-Optical Receiver Laboratory

PRIMARY CAPABILITIES:

Calibrate, test, and evaluate infrared and laser sensors and warning receivers in Bands I, II, and III

SPECIAL/UNIQUE CAPABILITIES:

Classified facility with additional capabilities for foreign equipment exploitation

Capability for both laboratory and field testing

Field tests utilize outdoor WL turntable facility located on WPAFB, Area C, flight line for rotation of full scale aircraft

INSTRUMENTATION:

Large array of optical, electronic, and data processing hardware in a facility comprising greater than 5000 square feet

Equipment account exceeds a value of \$2,000,000

Large optical collimator

AVAILABILITY:

Available on a case-by-case basis to support outside R&D

Utilized nearly full-time supporting in-house projects

LOCATION:

BUILDING: 4B ROOM:

POINT OF CONTACT:

WL/AAWP

WPAFB, OH 45433-6543

(513) 255-2471

DSN 785-2471



Electro-Optical Receiver Laboratory

FACILITY TYPE:

Exploitation

PURPOSE:

Radar evaluation of exploitation threat radar systems;
conduct ECM evaluation against these threat radars

FACILITY NAME:

Hangar 4B Anechoic Chambers

PRIMARY CAPABILITIES:

Chambers can accommodate RF systems from 2 GHz to 20 GHz

Connected to a computer facility that simulates the
outside EW environment and geometry between the target
and the aircraft

SPECIAL/UNIQUE CAPABILITIES:

Basic dimensions: 140 ft long by 50 ft wide by 35 ft
high

Chamber is connected to movable hangar door allowing
insertion of tactical size USAF fighter aircraft

INSTRUMENTATION:

Equipment on hand can accommodate radar/ECM evaluations

AVAILABILITY:

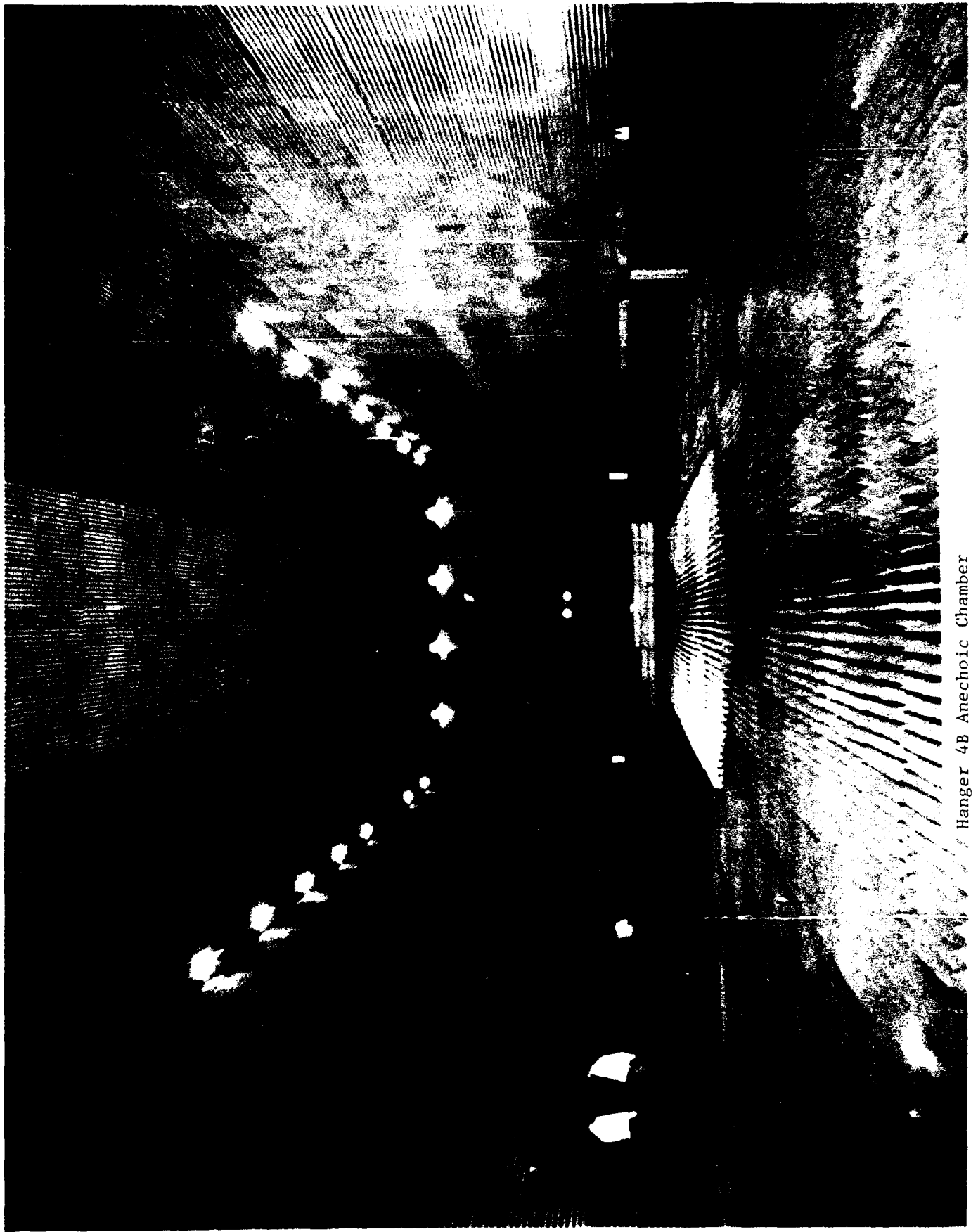
Fully scheduled for next five to six years (1995-96)

LOCATION:

BUILDING: 4B ROOM:

POINT OF CONTACT:

WL/AAWP
WPAFB, OH 45433-6543
(513) 255-2471
DSN 785-2471



Hanger 4B Anechoic Chamber

FACILITY TYPE:

Integrated Circuits

PURPOSE:

Identify unknown integrated circuits (ICs)

FACILITY NAME:

Integrated Circuit Exploitation Facility

PRIMARY CAPABILITIES:

Identify undamaged unknown ICs and predict the identity of damaged ICs

SPECIAL/UNIQUE CAPABILITIES:

Classified facility with capability for foreign item exploitation

INSTRUMENTATION:

Jet etcher to non-destructively open ICs;
temperature-humidity environmental chamber; an X-ray machine

Optical microscopes; a scanning electron microscope; a computerized IC database

AVAILABILITY:

Case-by-case basis to support outside R&D (government agencies, contractors)

Utilized nearly full-time supporting in-house projects

LOCATION:

BUILDING: 4B ROOM:

POINT OF CONTACT:

WL/AAWP
WPAFB, OH 45433-6543
(513) 255-2471
DSN 785-2471



Integrated Circuit Exploitation Facility

FACILITY TYPE:

RF Receiver and Processor

PURPOSE:

Evaluation and development of new RF receiver, processor, and software concepts

FACILITY NAME:

RF Receiver/Processor Laboratory

PRIMARY CAPABILITIES:

Calibrate, test, evaluate, and develop new RF receiver systems in frequency range 2 to 18 GHz

Test, evaluate, develop new threat sorting and identification software techniques

SPECIAL/UNIQUE CAPABILITIES:

Classified facility and screen room

Capability of both laboratory and field tests

Capability to collect and analyze special signals of interest

INSTRUMENTATION:

Prototype receivers-superhet, instantaneous frequency measurement, microscan, channelized, optical

Various RF transmission and modulation techniques available

Sorting and identification software prototype available

AVAILABILITY:

Available on a case-by-case basis to support outside R&D

Currently utilized nearly full time

LOCATION:

BUILDING: 620 ROOM: CA33

POINT OF CONTACT:

WL/AAWP

WPAFB, OH 45433-6543

(513) 255-6131

DSN 785-6131



RF Receiver/Processor Laboratory

FACILITY TYPE:

Infrared Target Simulator

PURPOSE:

Research and develop infrared countermeasures (IRCM) techniques

FACILITY NAME:

Dynamic Infrared Missile Evaluator (DIME)

PRIMARY CAPABILITIES:

Provides semiphysical simulation of the homing interception of a target by an IR guided missile

Optics and instrumentation for evaluating IRCM effects upon infrared missiles

SPECIAL/UNIQUE CAPABILITIES:

Use actual IR missile optics and guidance electronics along with computer simulated, aerodynamic characteristics and servo controlled IR sources

INSTRUMENTATION:

Operational IR missile guidance and control units

Digital aerodynamic computational capability

Servo-controlled IR sources/optics

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 620 ROOM: C/A 33

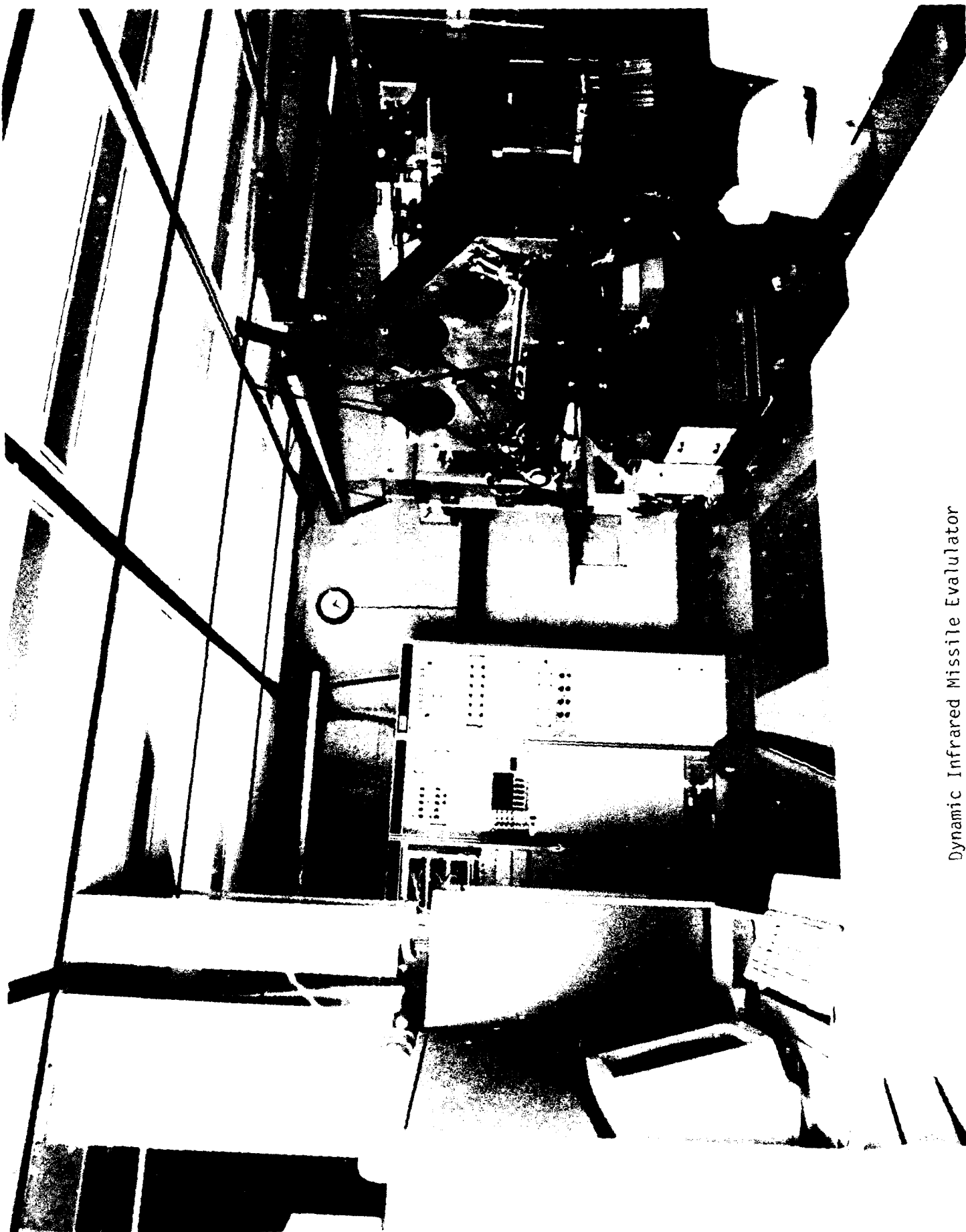
POINT OF CONTACT:

WL/AAWW

WPAFB, OH 45433-6543

(513) 255-4174

DSN 785-4174



Dynamic Infrared Missile Evaluator

FACILITY TYPE:

Electronic Warfare

PURPOSE:

Develop and evaluate RF electronic countermeasures techniques, devices, and systems

FACILITY NAME:

Electronic Warfare Anechoic Chamber (EWAC)

PRIMARY CAPABILITIES:

39'L x 26'W x 26'H electromagnetically shielded room lined with radio frequency (RF) energy absorbing material

Used for RF measurements, such as antenna polarization patterns, from 250MHz to 100 MHz

Ability to test/evaluate most types of radar ECM hardware/techniques against hardware-in-the-loop simulations of seeker/target interactions

SPECIAL/UNIQUE CAPABILITIES:

Instrumentation system for measuring and printing 3D plots of angle error voltage developed by a monopulse tracking radar in response to polarization jamming

Target Angle Positioning System (TAPS)

TAPS: array of 64 dual polarized antennas (7-11 GHz) to create physical simulation of moving target/jammer; polarization of target and jammer real time controlled

INSTRUMENTATION:

Wide range of microwave instrumentation

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 620 ROOM: S2R1

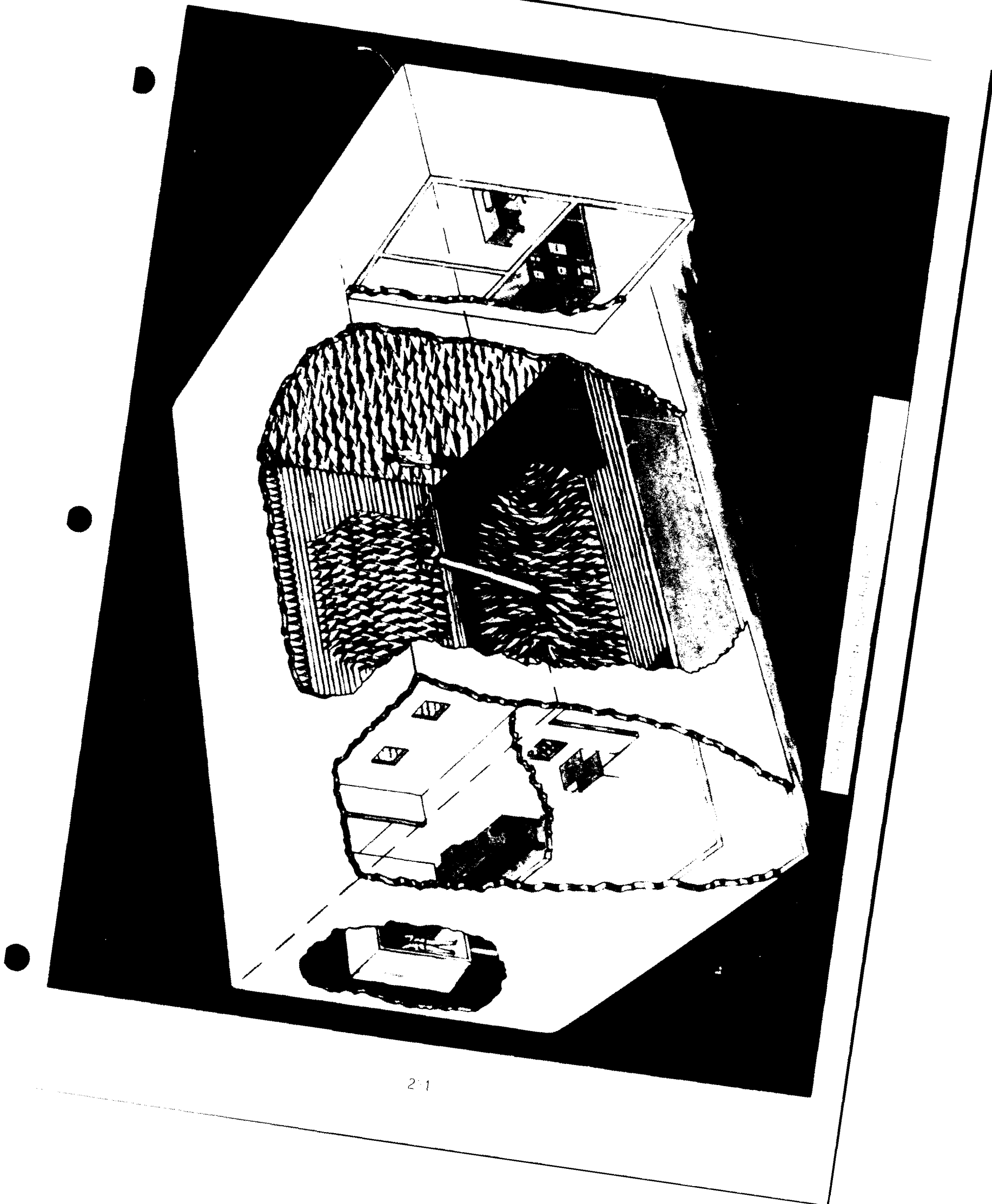
POINT OF CONTACT:

WL/AAWW

WPAFB, OH 45433-6543

(513) 255-6504

DSN 785-6504



FACILITY TYPE:

Multispectral Signature Generation

PURPOSE:

Assessment of multispectral signature control techniques for EOCM

FACILITY NAME:

Electro-Optical Signature Analysis System (EOSAS)

PRIMARY CAPABILITIES:

Interactive image processing system that allows aircraft signature modifications to be designed, modified, and evaluated by use of an image array processor

SPECIAL/UNIQUE CAPABILITIES:

Can manipulate imagery representing both the aircraft signature and camouflage treatment of interest

Multi-spectral tool to be used for signature analysis into the year 2000 and beyond

Can be used to evaluate field test data; sensor model for IRCM assessment

INSTRUMENTATION:

Image processing software; signature analysis tools

Probability of detection software

SPIRITS; generic sensor model

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 620 ROOM: C/A33

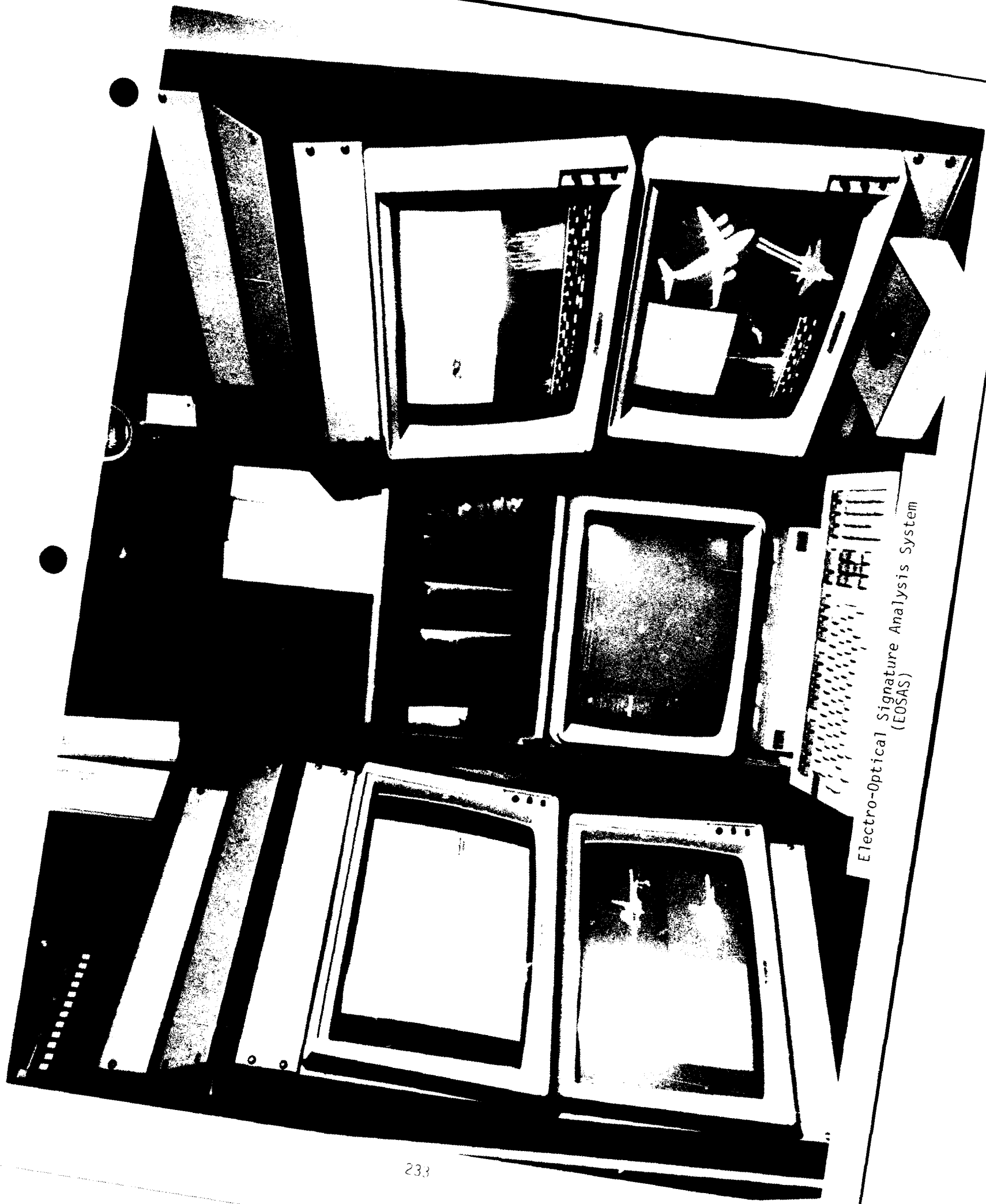
POINT OF CONTACT:

WL/AAWW

WPAFB, OH 45433-6543

(513) 255-4174

DSN 785-4174



Electro-Optical Signature Analysis System
(EOSAS)



FACILITY TYPE:

Composite Structures Fabrication

PURPOSE:

Provide design and fabrication support to DOD and other Government agencies in the area of advanced structures

FACILITY NAME:

Structural Composites Concepts Facility

PRIMARY CAPABILITIES:

Prototype component and mold design, lay-up, autoclave and press cure, and machining of advanced composite parts and structures from ASTM spec test specimens

(cont) to full scale structures

Specialization in the areas of high tolerance machining and bonding technology as applied to advanced composite and metallic materials

SPECIAL/UNIQUE CAPABILITIES:

Fabrication capabilities include all industry standard thermoset and thermoplastic composite materials

Expert in standard and nonstandard surface preparation and bonding systems; two and three dimensional, variable geometries are standard projects

Prototype and first effort designs are the usual program

INSTRUMENTATION:

6'x18' 400 deg F, 150 psi autoclave; 4'x8' 850 deg F, 260 psi autoclave; abrasive waterjet cutting system (single and 3 axis); ASTM chemical analysis capabilities

Vertical Dynatup impactor over a horizontal MTS, with 1Mhz data acquisition system, for performing impact studies on composites while under mechanical preload

(cont) and temperature (-200 to 1300 degF); complete capabilities for performing ASTM and nonstandard mechanical properties testing; fully equipped machine shop

AVAILABILITY:

Available to U.S. Government agencies and their contractors

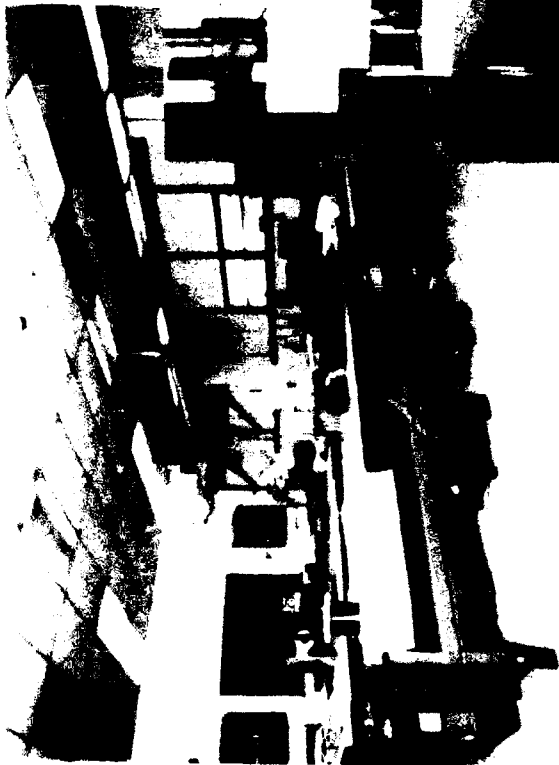
Available to some foreign nations

LOCATION:

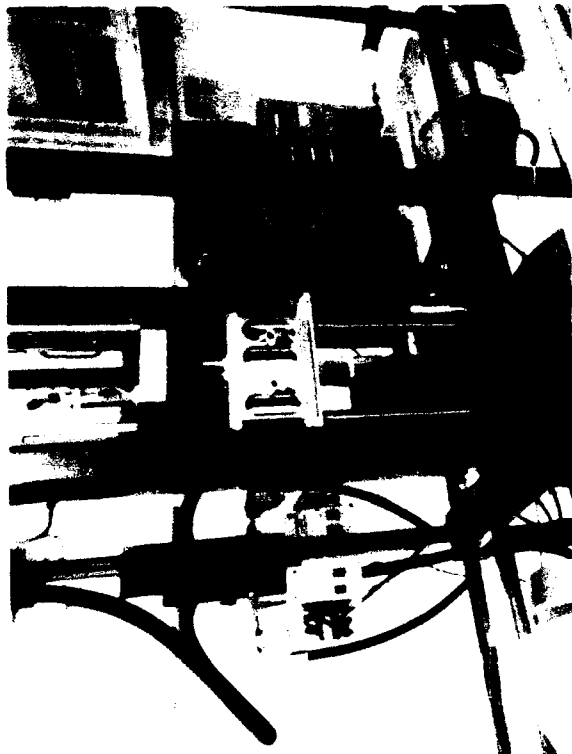
BUILDING: 65 ROOM: 300N

POINT OF CONTACT:

WL/FIBC
WPAFB, OH 45433-6553
(513) 255-6658
DSN 785-6658

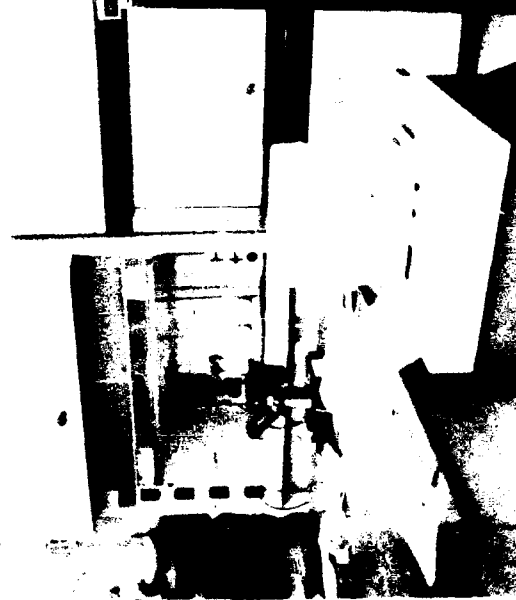


100 ton,
900 degF hydraulic press



Environmentally Controlled Layup Room

low velocity impact test facility



Chemical Analysis Room



4' dia x 8' long, 900 degF,
260 psi autoclave



3-axis CNC abrasive water-jet

FACILITY TYPE:

Aircraft Structures Test Facility

PURPOSE:

Experimental investigation and life verification of the fatigue and fracture behavior of structural elements

FACILITY NAME:

Fatigue and Fracture/Extreme Environment Test Facility

PRIMARY CAPABILITIES:

Test for experimental investigation & life validation to ensure structural durability and damage tolerance under a variety of simulated environmental conditions

SPECIAL/UNIQUE CAPABILITIES:

Includes both mechanical (static) and hydraulic (fatigue) test machines; element/sub-component testing from 10,000-500,000 pounds

Combined thermal/mechanical fatigue testing to 100,000lbs under controlled temperature ranges from -200 to 2300 deg F

Simulated altitude conditions from sea level to 250,000 ft with flexibility to mix up to 4 different gases

INSTRUMENTATION:

Digitally controlled test machines with both visual and automated crack-growth measurement capability

Computer workstation serves as redundant data acquisition system for applied loads

As many as 30 data channels may be used for data acquisition on a given test

AVAILABILITY:

Limited in-house research; discretionary test support for outside businesses

US Government agencies and contractors

LOCATION:

BUILDING: 65 ROOM: 110

POINT OF CONTACT:

WL/FIBE

WPAFB, OH 45433-6553

(513) 255-5956

DSN 785-5056



Fatigue and Fracture/Extreme Environment Test Facility

FACILITY TYPE:

High Temperature Acoustic Test Chamber

PURPOSE:

To conduct combined high temperature and acoustic response and fatigue testing of structural components

FACILITY NAME:

Combined Environment Acoustic Test Facility

PRIMARY CAPABILITIES:

Test specimen size 4x4 feet

Temperatures up to 2500 degF

Overall sound pressure levels up to 180 dB

SPECIAL/UNIQUE CAPABILITIES:

Up to 300 channels of data may be measured and recorded

Transducers and signal conditioning for measurement of temperature, strain, pressure, and vibration

Laser vibrometer for non-contacting dynamics measurements

INSTRUMENTATION:**AVAILABILITY:**

April 1993

LOCATION:

BUILDING: 461 ROOM: 213

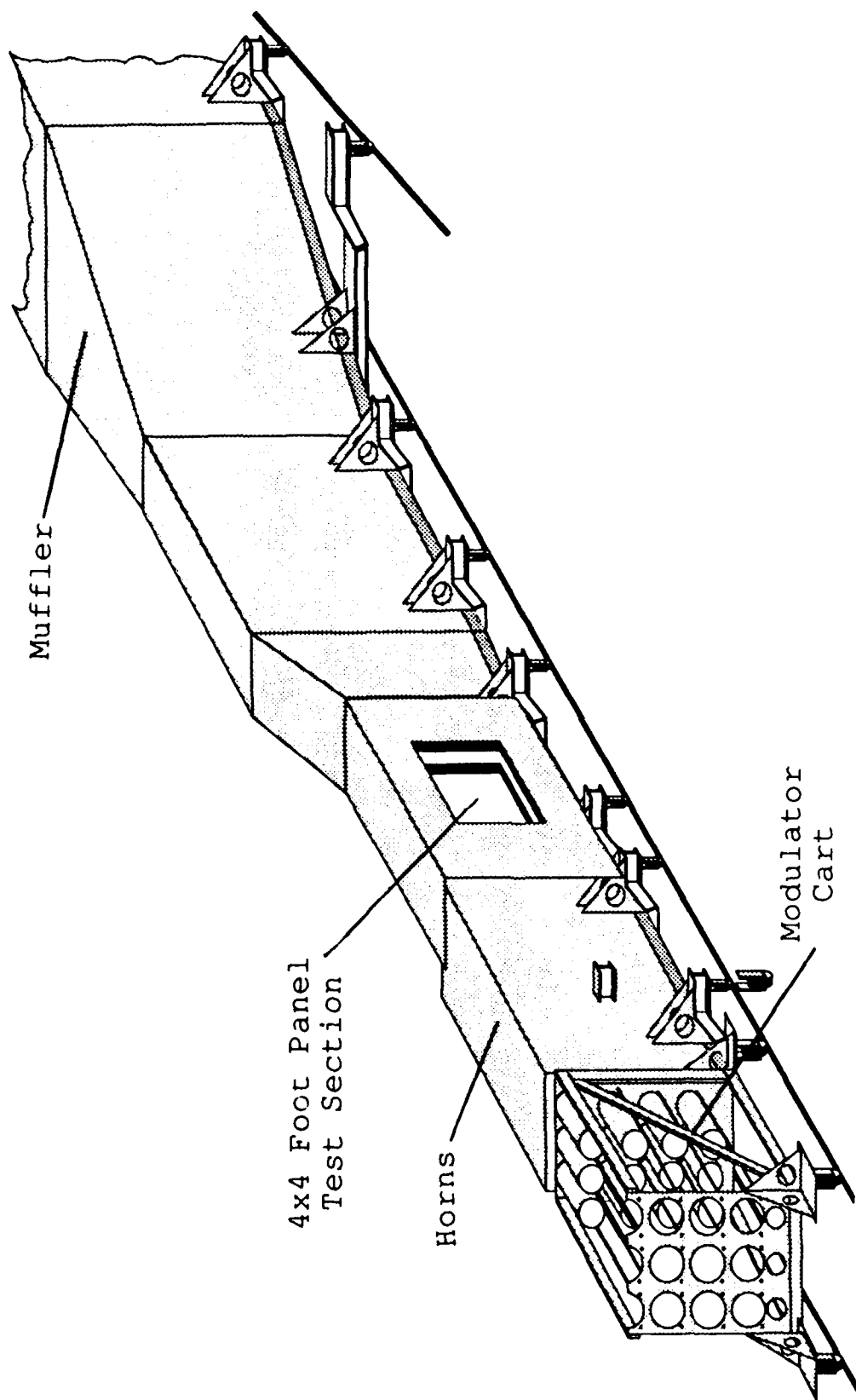
POINT OF CONTACT:

WL/FIBG

WPAFB, OH 45433-6553

(513) 255-5200

DSN 785-5200



Combined Environment Acoustic Test Facility

FACILITY TYPE:

Analysis Facility

PURPOSE:

Recover and analyze data from flight and ground tests

FACILITY NAME:

Dynamics Data Recovery and Analysis Facility

PRIMARY CAPABILITIES:

Playback, edit, and digitize dynamics data

Analyze digitized data using standard digital time series techniques involving Fast Fourier Transform algorithms

Present analysis results in report quality plots for interpretation by project engineers

SPECIAL/UNIQUE CAPABILITIES:

Recover data recorded in any standard FM-analog and PCM digital formats

Compute specialized frequency-domain functions including amplitude spectra, power spectral densities, transfer functions, coherence, and modal analysis

Develop software in-house to perform special analysis and plotting functions

INSTRUMENTATION:

Analog and PCM data recovery instrumentation

DEC VAX 11/780 configured with an array processor and a laser printer/plotter

AVAILABILITY:

Available to US Government agencies

Available to industry

LOCATION:

BUILDING: 24C ROOM: 216

POINT OF CONTACT:

WL/FIBG

WPAFB, OH 45433-5553

(513) 255-5200

DSN 785-5200



Dynamics Data Recovery and Analysis Facility

FACILITY TYPE:

Acoustic Test Chamber

PURPOSE:

Study high level acoustic effects on structures

FACILITY NAME:

Large Acoustic Test Facility

PRIMARY CAPABILITIES:

Sonic fatigue testing of aerospace panels

High intensity acoustic testing

SPECIAL/UNIQUE CAPABILITIES:

70 ft long x 56 ft wide test chamber; 10 ft diameter horn

Progressive wave ducts (up to 26 ft long duct; up to 167dB in 50 inch duct; up to 172dB in 12 inch duct)

4 x 1 ft progressive wave duct with sinusoidal or random noise (up to 3 x 3 ft flat test panels; up to 170 dB)

INSTRUMENTATION:

Up to 9 Wyle noise generators usable for either duct

On-site data acquisition, recording and analysis

Up to 96 signal conditioning and recording channels

AVAILABILITY:

Available to U.S. Government agencies

LOCATION:

BUILDING: 461 ROOM:

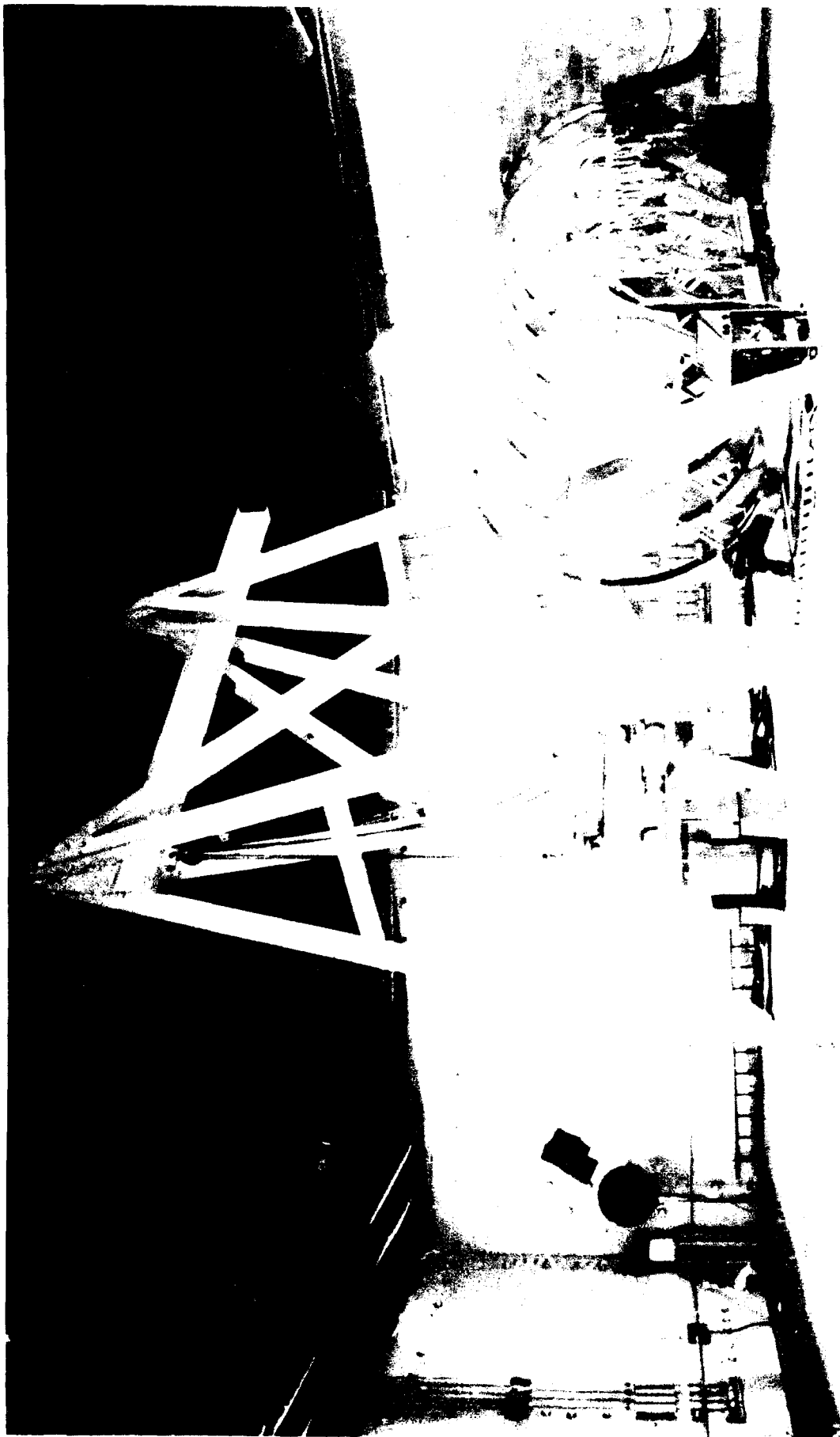
POINT OF CONTACT:

WL/FIBG

WPAFB, OH 45433-6553

(513) 255-6622

DSN 785-6622



FACILITY TYPE:

Mobile Data Acquisition

PURPOSE:

Mobile data acquisition

FACILITY NAME:

Mobile Data Acquisition

PRIMARY CAPABILITIES:

Offsite data acquisition, recording, and analysis

Two mobile vans

SPECIAL/UNIQUE CAPABILITIES:

3 to 4 day independent operation

L-band telemetry data receiving; remote control video;
optional central data reduction

36 channel recording/replay in Van #2

INSTRUMENTATION:

Van #1: Signal amplifiers, oscilloscopes,
oscillographs, voltmeters, time code generator, pulse
code commutation/decommutation; spectrum analyzers

Van #2: Honeywell 101 data recorder, Masscomp MC-500
computer with acquisition digitizer, laser and ink-jet
printers, low-pass filters, pulse code modulation

AVAILABILITY:

Available to U.S. Government agencies

LOCATION:

BUILDING: ROOM:

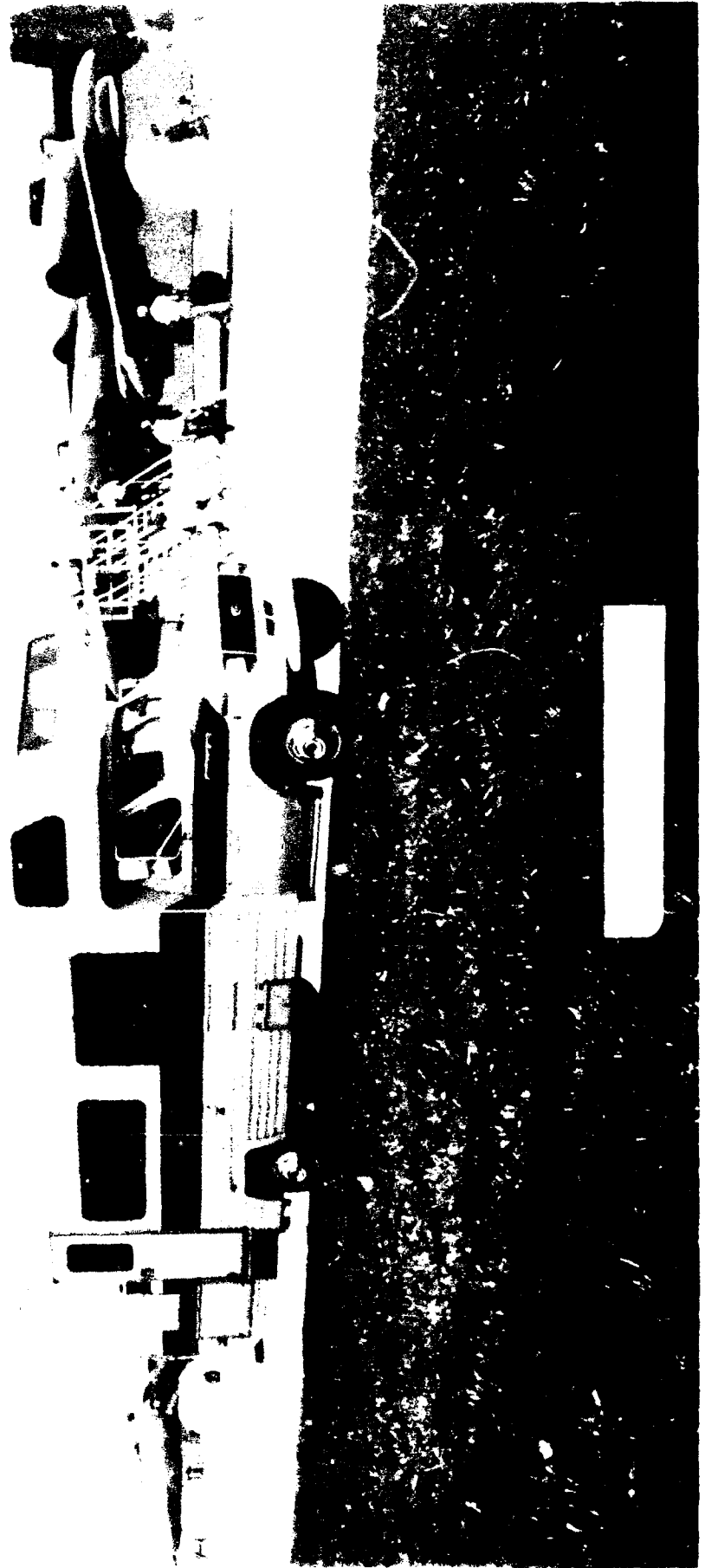
POINT OF CONTACT:

WL/FIBG

WPAFB, OH 45433-6553

(513) 255-6622

DSN 785-6622



FACILITY TYPE:

Photomechanics

PURPOSE:

Develop and apply techniques for the precision measurement of response of aerospace structures to various loads

FACILITY NAME:

Photomechanics Facility

PRIMARY CAPABILITIES:

Laser/optical-based Metrology

SPECIAL/UNIQUE CAPABILITIES:

Displacement measurement from less than a millionth of an inch to several feet

Non-contacting motion measurement from distances up to 70 meters

Bandwidth up to 10,000 Hz; modal response measurement up to 2,000 degF.

INSTRUMENTATION:

Motion analysis processor, laser vibrometers

Lateral effect diode measurement system

Video holography system; Shadow Moire System; image processing

AVAILABILITY:

Available to U.S. Government agencies

LOCATION:

BUILDING: 45 ROOM: 045

POINT OF CONTACT:

WL/FIBG

WPAFB, OH 45433-6553

(513) 255-6622

DSN 785-6622



Photomechanics Facility

FACILITY TYPE:

High Temperature Acoustic Test

PURPOSE:

Perform high temperature acoustic tests on aircraft structures

FACILITY NAME:

Prototype High Temperature Acoustic Facility

PRIMARY CAPABILITIES:

2,500 degF at 180 dB SPL combined tests on 1 x 3 ft structures

SPECIAL/UNIQUE CAPABILITIES:

Combined temperature and high acoustic levels with controlled heat flux for actively cooled structures

INSTRUMENTATION:

96 channels of data collection

6 channels of real time monitoring

AVAILABILITY:

Available to US Government agencies and their contractors

LOCATION:

BUILDING: 24C ROOM:

POINT OF CONTACT:

WL/FIBG

WPAFB, OH 45433-6553

(513) 255-5200

DSN 785-5200



Prototype High Temperature Acoustic Facility

FACILITY TYPE:

Acoustic Test Chamber

PURPOSE:

Study acoustic effects on structure

FACILITY NAME:

Quarter Scale Acoustic Test Chamber

PRIMARY CAPABILITIES:

Sonic fatigue testing of aerospace panels

High intensity acoustic testing

SPECIAL/UNIQUE CAPABILITIES:

Up to 167 dB SPL; bandwidth from 50 to 500 Hertz

Test panels up to 6 ft by 10 ft

Central data collection

INSTRUMENTATION:

Three Wyle noise generators.

On-site data acquisition, recording and analysis

Up to 96 signal conditioning and recording channels

AVAILABILITY:

Available to U.S. Government agencies

LOCATION:

BUILDING: 24B ROOM:

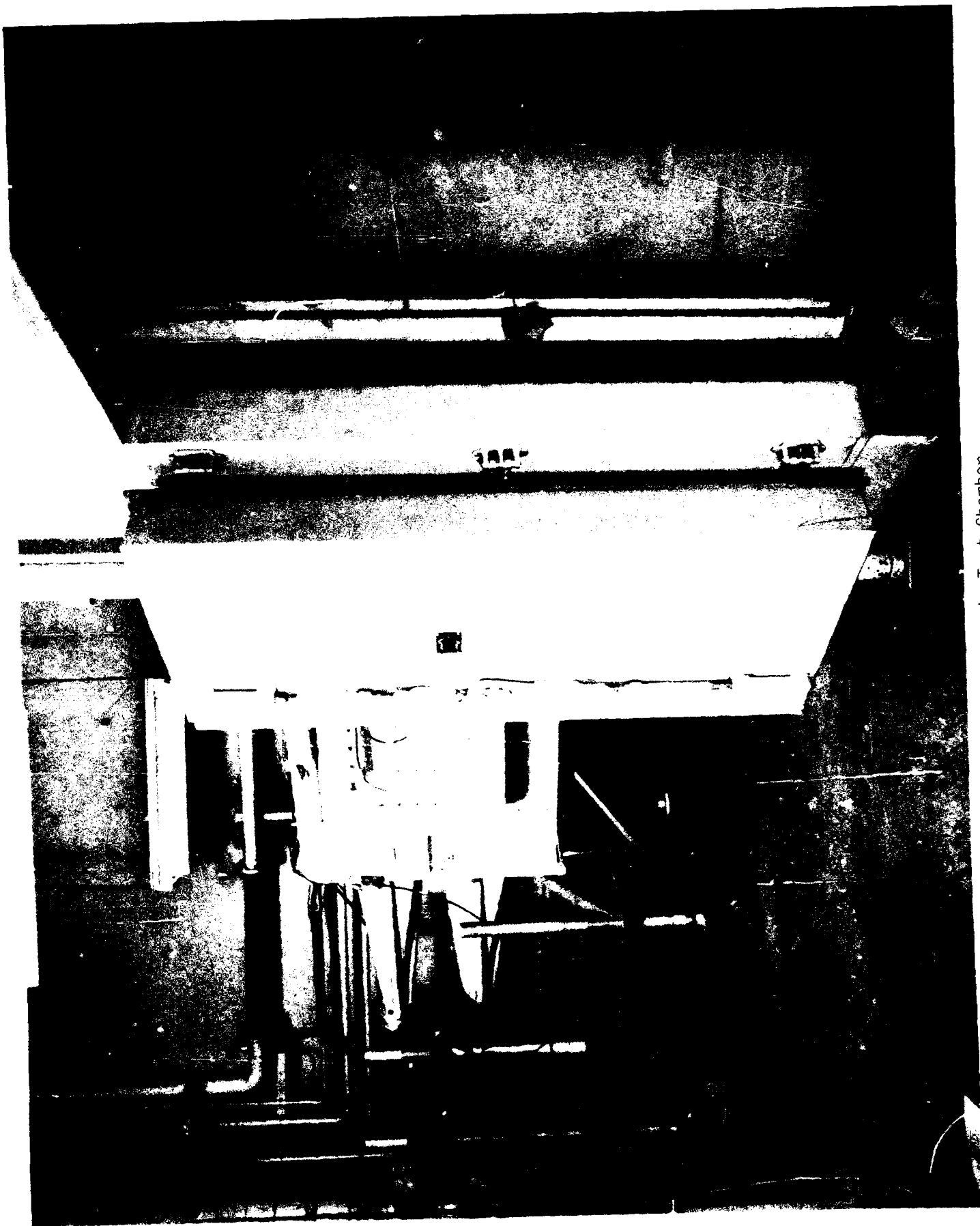
POINT OF CONTACT:

WL/FIBG

WPAFB, OH 45433-6553

(513) 255-6622

DSN 785-6622



Quarter Scale Acoustic Test Chamber

FACILITY TYPE:

Combined Environment Shaker Test

PURPOSE:

Determine fatigue life characteristics and damage mechanisms of materials and structural subelements elements

FACILITY NAME:

Random Fatigue Test Facility

PRIMARY CAPABILITIES:

20,000 lbs random force dynamic vibration; -250 to +2600 degF; variable atmospheric pressure to 200,000 ft altitude

SPECIAL/UNIQUE CAPABILITIES:

Test specimen size 3x7 inches; gas partial pressure environments O2, N2, He, Ar, and 3 percent H2

Shaker has flat power spectral density output from 20 to 2000 Hz; provides constant temperatures or thermal trajectories

INSTRUMENTATION:

Laser vibrometer for non-contacting dynamic measurement of temperature, strain, pressure, and vibration

AVAILABILITY:

US Government agencies and their contractors

LOCATION:

BUILDING: 461 ROOM: 111

POINT OF CONTACT:

WL/FIBG
WPAFB, OH 45433-6553
(513) 255-5200
DSN 785-5200



FACILITY TYPE:

Acoustic Test Chamber

PURPOSE:

Study acoustic effects on structure

FACILITY NAME:

Small Acoustic Test Chamber

PRIMARY CAPABILITIES:

Sonic fatigue testing of aerospace panels

Reliability testing of aircraft equipment

SPECIAL/UNIQUE CAPABILITIES:

176 dB maximum sound pressure level

Combined environment testing possible with temperatures up to 2,500 degF

Bandwidth from 50 to 500 Hz; central data collection

INSTRUMENTATION:

Four Wyle noise generators

2,500 degF test article heater, temperature measuring equipment

On-site data acquisition, recording and analysis, up to 96 signal conditioning and recording channels

AVAILABILITY:

Available to U.S. Government agencies

LOCATION:

BUILDING: 461 ROOM:

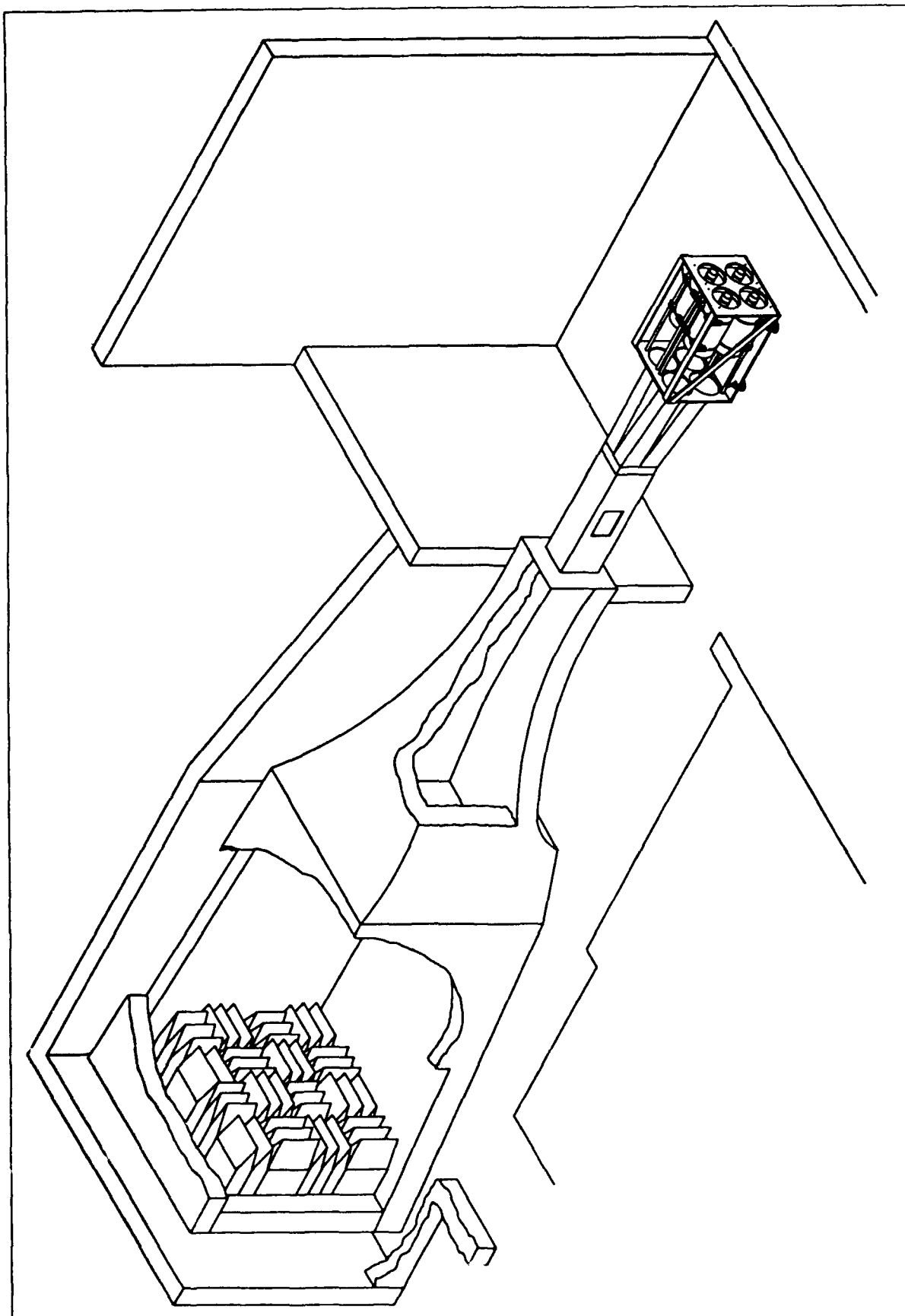
POINT OF CONTACT:

WL/FIBG

WPAFB, OH 45433-6553

(513) 255-6622

DSN 785-6622



Small Acoustic Test Chamber

FACILITY TYPE:

Vibration Test

PURPOSE:

Study effects of vibration on large aerospace structures

FACILITY NAME:

Vibration Test Facility

PRIMARY CAPABILITIES:

Vibration tests of aerospace systems

SPECIAL/UNIQUE CAPABILITIES:

Open and closed loop vibration control; 10 to 12,000 pound force excitation

30 ft long, 30 ft wide, 40 ft high acoustic and temperature controlled environment

Optional central data reduction

INSTRUMENTATION:

96 channel PCM data recording system; 4 channel Gen Rad modal test system; 4 channel Hewlett Packard modal test system

10 to 12,000 pound force shakers; two real-time digital control computers; 64 channel Zonic Data Acquisition and Analysis System

Accelerometers, strain gauges, optical and mechanical displacement transducers; laser vibrometer

AVAILABILITY:

Available to U.S. Government agencies

Available to industry

LOCATION:

BUILDING: 24B ROOM:

POINT OF CONTACT:

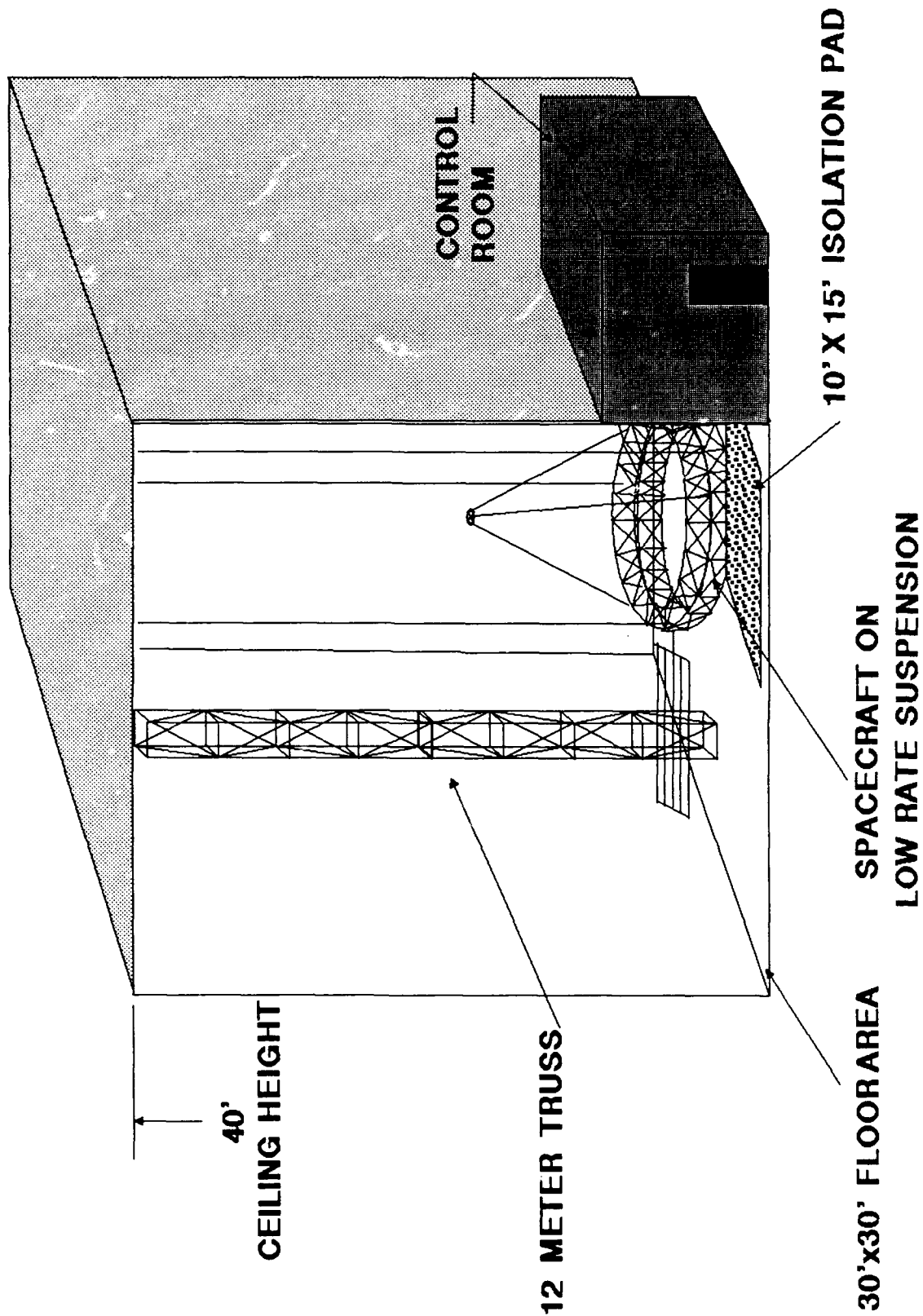
WL/FIBG

WPAFB, OH 45433-6553

(513) 255-6622

DSN 785-6622

VIBRATION TEST FACILITY



FACILITY TYPE:

Aerospace Structures

PURPOSE:

Simulate high temperature structural effects

FACILITY NAME:

Elevated Temperature Test Facility

PRIMARY CAPABILITIES:

Hot structures testing (leading edges, cowlings, etc.) up to 4200 deg F

Coupon level to full scale structures testing

Cryogenic testing down to -410 degF

SPECIAL/UNIQUE CAPABILITIES:

Quartz Lamps

Graphite Heaters; Vortec Arc Lamps

Combinations of above with mechanical load

INSTRUMENTATION:

Extensive monitoring and processing of test parameter data

2000 channel data system

Temperature, strain and flux measurements

AVAILABILITY:

Available to U.S. Government agencies

Limited industrial use

LOCATION:

BUILDING: 65 ROOM:

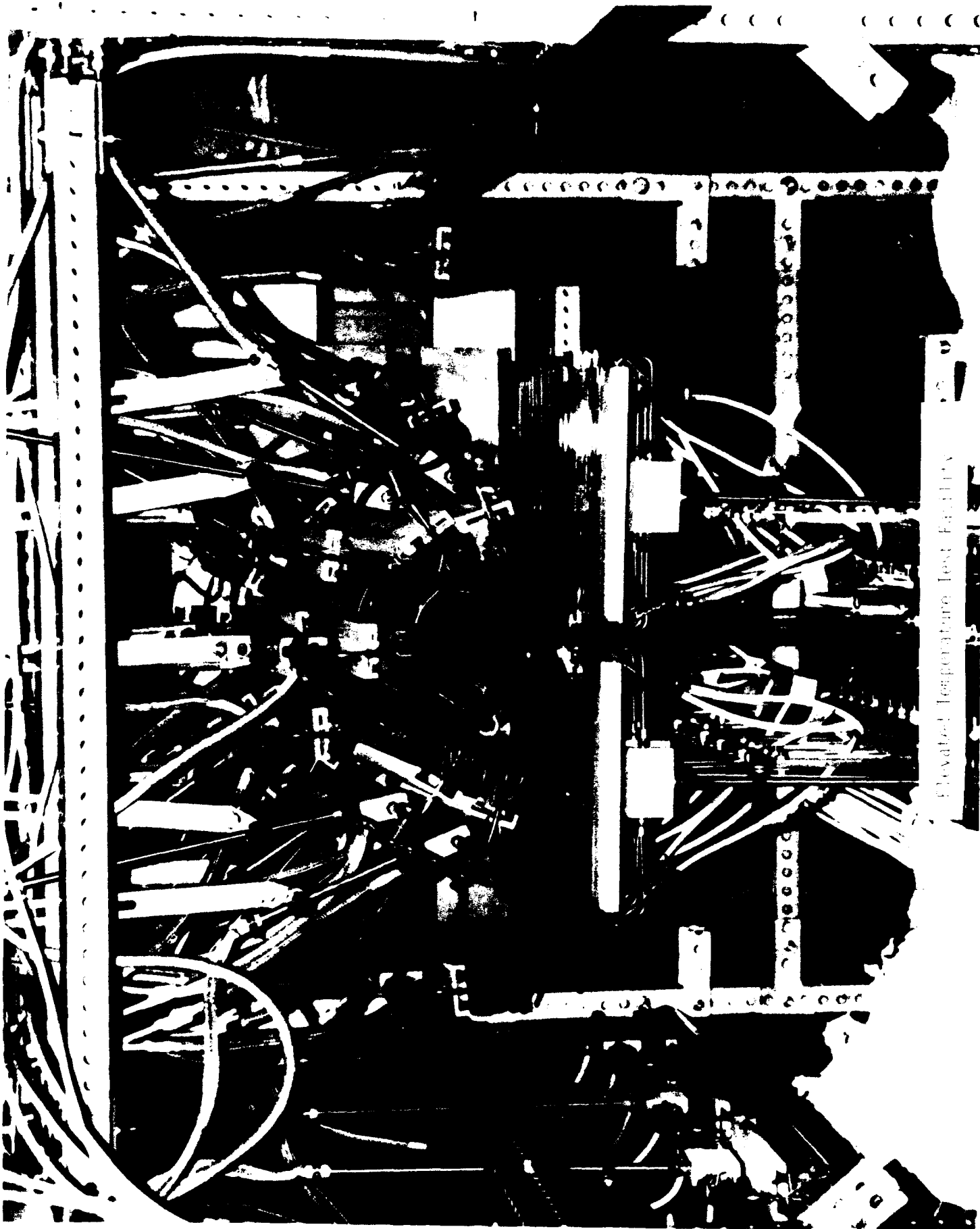
POINT OF CONTACT:

WL/FIBT

WPAFB. OH 45433-6553

(513) 255-5059

DSN 785-5059



Flooded Temperature Test Facility

FACILITY TYPE:

Structures Research and Development

PURPOSE:

Conduct small size structural component tests with cryogenic fuel simulation for purposes of structural analysis verification

FACILITY NAME:

Mini-Liquid Hydrogen Test Facility

PRIMARY CAPABILITIES:

Test table-top size components to true flight profile thermal and mechanical loads

Use liquid or gaseous hydrogen, helium or nitrogen for thermal stress simulation during tests in above profiles

SPECIAL/UNIQUE CAPABILITIES:

Ability to handle liquid hydrogen safely during high temperature structural tests

INSTRUMENTATION:

Large, dedicated computer system available

Extensive monitoring and processing of test parameters

Temperature, strain and flux measurements

AVAILABILITY:

Primarily in-house research

Available to government contractors

LOCATION:

BUILDING: 65 ROOM:

POINT OF CONTACT:

WL/FIBT

WPAFB, OH 45433-6553

(513) 255-5059

DSN 785-5059



Mini-Liquid Hydrogen Test Facility

FACILITY TYPE:

Aircraft Structures Test

PURPOSE:

Structural testing of aircraft and advanced design concepts

FACILITY NAME:

Structures Test Facility

PRIMARY CAPABILITIES:

Research and development structures

Static and fatigue testing

From component(s) to full size, complete aerospace vehicles

New structural concepts

SPECIAL/UNIQUE CAPABILITIES:

Baseline data comparisons (real time)

Development of newer, improved testing techniques

Classified capabilities

INSTRUMENTATION:

Large, dedicated computer system available

Extensive monitoring and processing of test parameters

AVAILABILITY:

Available to U.S. Government agencies

Limited industrial use

LOCATION:

BUILDING: 65 ROOM:

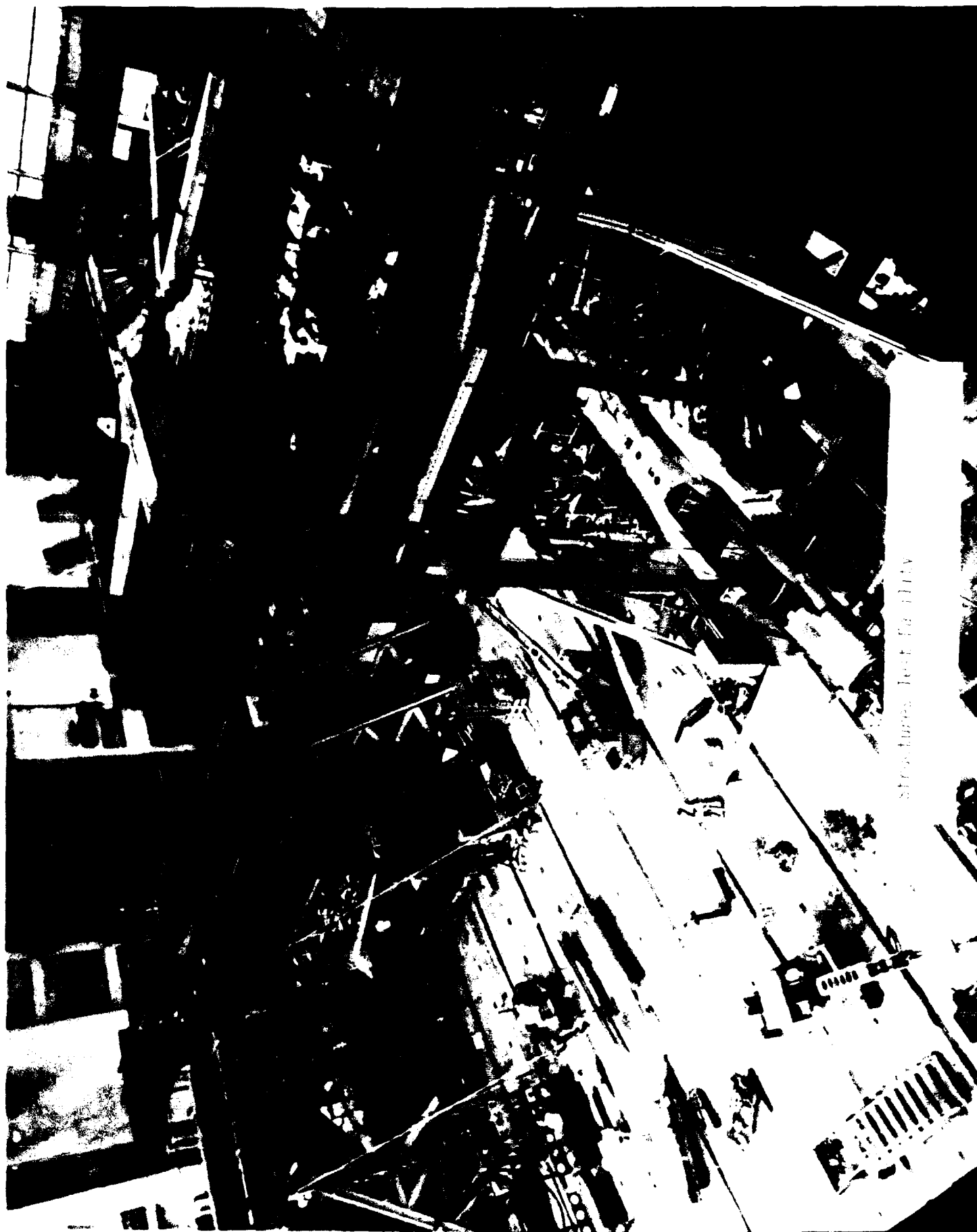
POINT OF CONTACT:

WL/FIBT

WPAFB, OH 45433-6553

(513) 255-5059

DSN 785-5059



FACILITY TYPE:

Radiant Heat Tests

PURPOSE:

Provide continuous high intensity radiation energy for use in advanced thermal testing and evaluation of structural components and panels

FACILITY NAME:

Vortek Radiation Heating Test Facility

PRIMARY CAPABILITIES:

Vortek System I (300KW): parabolic reflector- power level 0.4KW/cm² to approximately 200 cm²; ellipsoidal reflector- 3.0KW/cm² to estimated 15 cm²

Vortek System II (600KW): gold electroplated reflector provides 2.7KW/cm² over a target area of 10 cm by 1.3 cm

Vortek System III (600KW): gold electroplated reflector provides 2.7KW/cm² over target area 10cm by 1.3cm; designed with remote lamp assembly connected to the

(cont) main unit by an umbilical (hoses, cables, etc) system

SPECIAL/UNIQUE CAPABILITIES:

Provides the capability to simulate the thermal environment likely to be encountered by various advanced structures being evaluated and certified for

(cont) hypersonic vehicles

INSTRUMENTATION:

Vortek Systems operated and controlled remotely by computers

Systems calibrated to provide power levels vs distances from the maximum power areas

Capabilities available to record and process all data from tests and evaluations

AVAILABILITY:

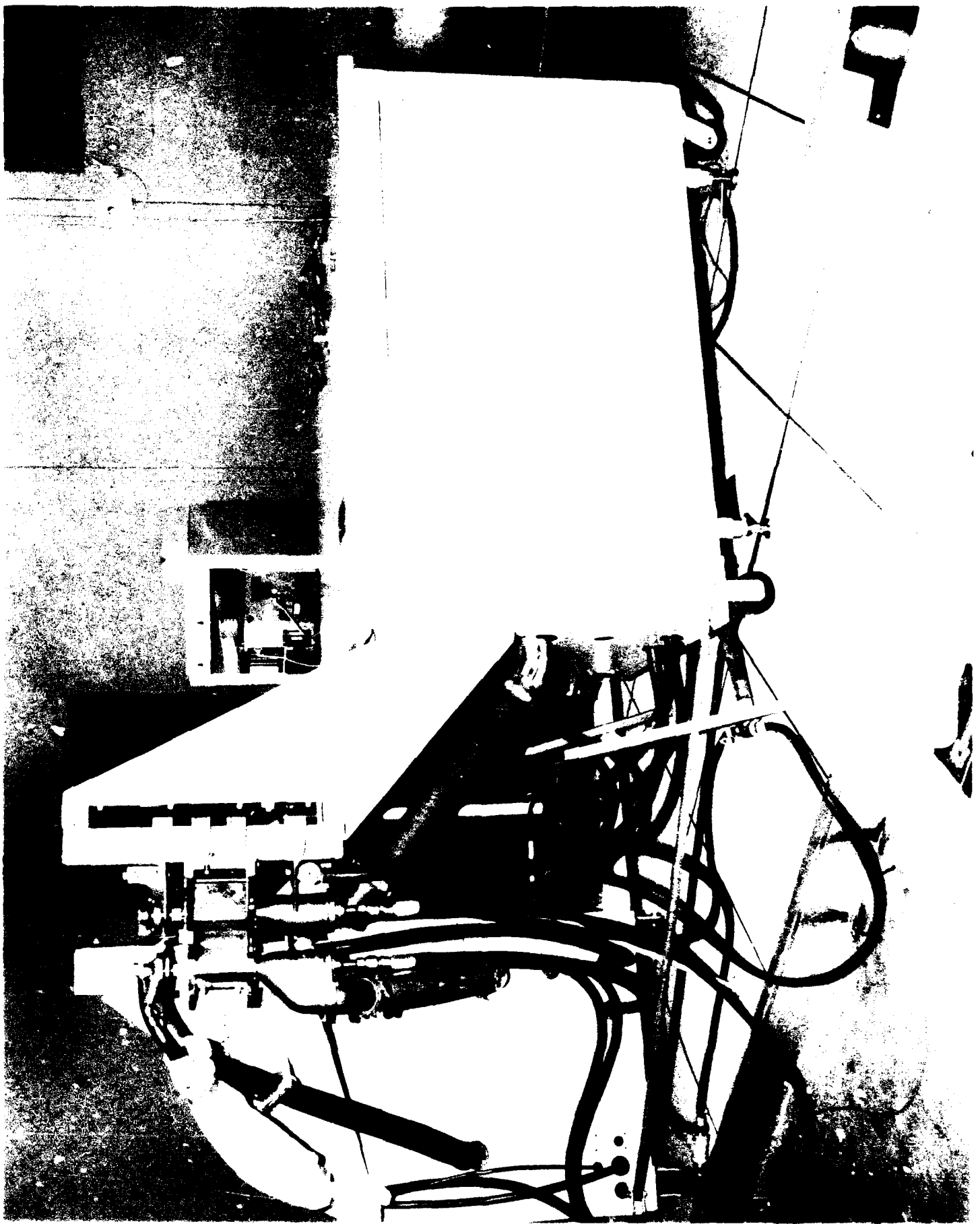
Available to US Government agencies and their contractors

LOCATION:

BUILDING: 65 ROOM: Area B

POINT OF CONTACT:

WL/FIBT
WPAFB, OH 45433-6553
(513) 255-3216
DSN 785-3216



FACILITY TYPE:

Real-Time Piloted Engineering Flight Simulation

PURPOSE:

Develop flight vehicle and flight control technology;
integrate and assess multidisciplinary technologies in
simulated combat mission environments

FACILITY NAME:

Control Integration and Assessment Laboratory

PRIMARY CAPABILITIES:

Piloted flight simulation in large amplitude motion and
high quality visual flight simulator for supporting
flying qualities and safety of flight evaluations

Piloted flight simulation in high fidelity visual
mission flight simulator for supporting the integration
and assessment of weapon system technologies in

(cont) simulated combat mission environments

SPECIAL/UNIQUE CAPABILITIES:

Large amplitude five-degrees-of-freedom motion simulator

40-foot dome full field-of-view visual mission simulator

Piloted manned combat stations; mission simulation
planning and control suite; computer generated visual
and cockpit display image generation systems

INSTRUMENTATION:

Full record and analysis of flight and mission
parameters

AVAILABILITY:

Primarily in-house research

Limited outside use

LOCATION:

BUILDING: 145 ROOM: 101

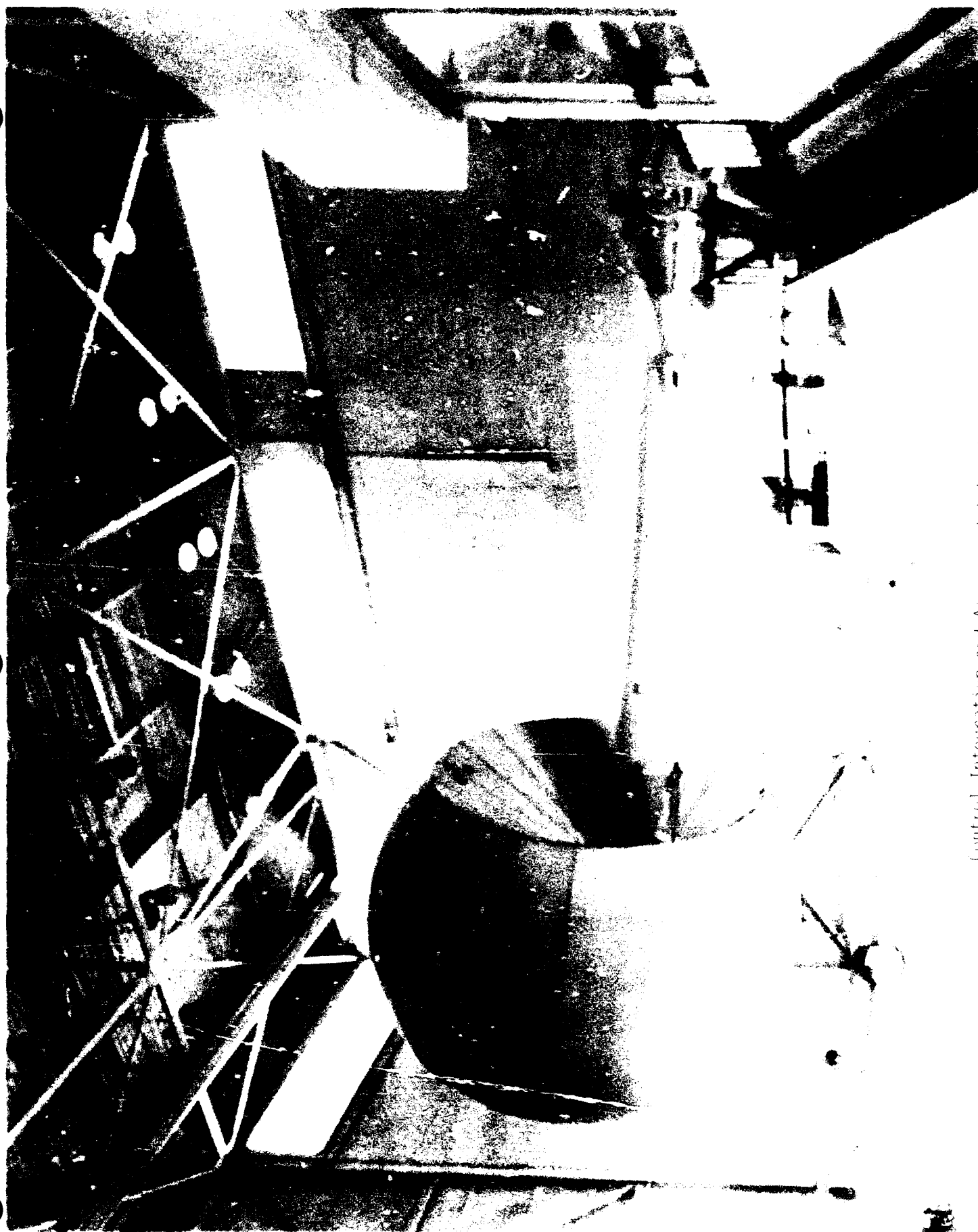
POINT OF CONTACT:

WL/FIGD

WPAFB, OH 45433-6553

(513) 255-4690

DSN 785-4690



Control Integration and Assessment Laboratory

FACILITY TYPE:

Lockheed NT-33A

PURPOSE:

Provide a research and development resource that allows airborne simulation evaluation of flying qualities & flight control characteristics of various aircraft

FACILITY NAME:

NT-33A In-Flight Simulator

PRIMARY CAPABILITIES:

Simulate the flight characteristics and properties of fighter-type aircraft and evaluate the handling qualities of different flight control systems

Aircraft housed at Calspan Flight Research Center, Buffalo NY when it is not deployed to an operating base

SPECIAL/UNIQUE CAPABILITIES:

Programmable HUD with display generator allows quick changes to display formats and provides a computer-generated target

INSTRUMENTATION:

Normal instrumentation for T-33A including alpha and beta vanes; Rolm 1602 computer; accelerometers for all 6 degrees of freedom; data and video recorders

AVAILABILITY:

Available to Air Force and Navy Test Pilot Schools

Available for research work

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/FIGD

WPAFB, OH 45433-6553

(513) 255-3853

DSN 785-3853



1960 X-15



1990 YF-22



1989 JAS 39



1987 VISTA / NF-16



1985 LAVI

NT-33 IN-FLIGHT
SIMULATIONS



1971 A-10



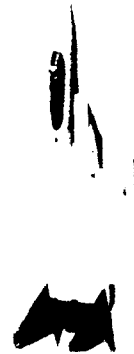
1957 - PRESENT



1981 AF-11 / F-16



1972 YF-17



1972 F-15



1973 F-16



1978 F-18

FACILITY TYPE:

Convair NC-131H Aircraft

PURPOSE:

Provide a research and development resource that allows airborne simulation to evaluate flying qualities and flight control characteristics of various aircraft

FACILITY NAME:

Total In-Flight Simulator (TIFS)

PRIMARY CAPABILITIES:

Simulate the flight characteristics and properties of different aircraft, different flight control systems, and cockpit layouts

Aircraft housed at Calspan Flight Research Center, Buffalo NY when it is not deployed to an operating base

SPECIAL/UNIQUE CAPABILITIES:

Simulation cockpit able to be configured like the cockpit of the simulated aircraft

Can be configured for avionics system training by replacing simulation cockpit with a radome that houses modern radar, avionics, and IR sensors

INSTRUMENTATION:

Accelerometers for all 6 degrees of freedom; alpha and beta vanes; data recorders; two Rolm Hawk computers; Hewlett-Packard work station

Can be instrumented for any other type of airborne components/system, either for the simulation configuration or the avionics system training

AVAILABILITY:

Available to Air Force and Navy Test Pilot Schools

Available for research work

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

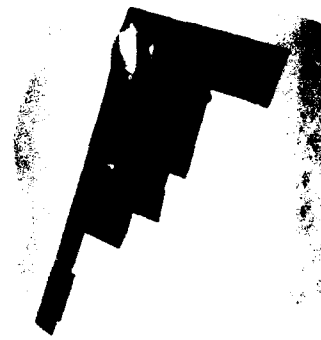
WL/FIGD
WPAFB, OH 45433-6553
(513) 255-3853
DSN 785-3853



1971-74 B-1



1989 YF-23



1986-89 B-2



1987 - ADVANCED
COMMERCIAL TRANSPORT



1986 CHEM DEFENSE
DRUGS



1972-85
SPACE SHUTTLE



NC-131H
1971 - PRESENT



1984 X-29



1975
RPV AUTOLAND



1973 CONCORDE



1980 LARGE AIRCRAFT
HANDLING QUALITIES



1983 NASA RESEARCH

FACILITY TYPE:

Control Systems Architecture

PURPOSE:

Research and develop digital hardware and software systems for use in flight control and vehicle management systems

FACILITY NAME:

Control Systems Architecture Laboratory

PRIMARY CAPABILITIES:

Develop and test capabilities of digital hardware circuits, particularly those based on microprocessor technology

Contains the capabilities to produce laboratory demonstration brassboards and testbeds

Contains software development capabilities, programmable logic support, and limited CAD/CAE

SPECIAL/UNIQUE CAPABILITIES:

Utilize a multi-user software development system and several in-circuit microprocessor emulation systems

Has capabilities for construction of wire-wrap circuitry and capabilities for printed circuit boards

INSTRUMENTATION:

In-circuit emulators (Tek 8560/40 systems, Intel 80960KB); logic analyzers (Tektronix 1240, DAS 9200)

Digital oscilloscope; logic/EPROM programmer (Data I/O Unisite); Z-248s; IBM-AT; Unisys 386

AVAILABILITY:

Primarily in-house research

Limited use by U.S. Government agencies and contractors

LOCATION:

BUILDING: 146 ROOM: 215

POINT OF CONTACT:

WL/FIGS

WPAFB, OH 45433-6553

(513) 255-8295

DSN 785-8288

CONTROL SYSTEMS ARCHITECTURE LABORATORY



FACILITY TYPE:

General Purpose Laboratory

PURPOSE:

Design, develop, evaluate or modify aircraft flight management hardware and software; evaluate systems and system modifications prior to ground or flight test

FACILITY NAME:

Control Systems Integration Laboratory

PRIMARY CAPABILITIES:

Bench checkout and analysis of airborne electronic equipment and related software; fabrication of brassboard equipment

Prototyping and evaluation of new control laws, algorithms or other flight management software

Modification, maintenance and repair of flight management system hardware and software in support of ground and flight testing

SPECIAL/UNIQUE CAPABILITIES:

Symbolics 3670 and LMI Lambda lisp computers

Software support tools: GEMS, KEE/ART/LISP, LISP/PEARL

Video disk recorder

INSTRUMENTATION:

Oscilliscopes, electrical meters, personal computers

AVAILABILITY:

In-house research and support of contract programs

Available to US Government agencies and contractors

LOCATION:

BUILDING: 146 ROOM: 220

POINT OF CONTACT:

WL/FIGS

WPAFB, OH 45433-6553

(513) 255-4026

DSN 785-4026



Control Systems Integration Laboratory

FACILITY TYPE:

Actuation Research and Development

PURPOSE:

Flight Control Actuator Research

FACILITY NAME:

Flight Control Actuation and Hydraulic Systems Facility

PRIMARY CAPABILITIES:

R&D of flight control actuators and subsystems

Test and evaluation of actuation devices

Evaluation of hydromechanical and electromechanical actuators

SPECIAL/UNIQUE CAPABILITIES:

General Purpose Actuator Test Rig: generate 85,000 lbs output force; evaluate linear actuation devices under simulated static and aerodynamic loading conditions

Flight Control Actuation Simulator: simulate flight control actuation systems; simulate static and aerodynamic load conditions on the simulated systems

Multi-Purpose Actuation System Test Rig: contains 36 loading actuators (18 top and 18 bottom) each capable of 3000 pounds of output force

INSTRUMENTATION:

Oscilloscopes, signal analyzers, pen and chart recorders, Hewlett-Packard Data Acquisition System

Environmental chamber (-100 degF to + 350 degF)

Hydraulic pumps, hydraulic test bench, pressure gages, miscellaneous equipment and power and hand tools

AVAILABILITY:

Primarily in-house research

Limited U.S. Government agency and industrial use

LOCATION:

BUILDING: 145 ROOM: 273

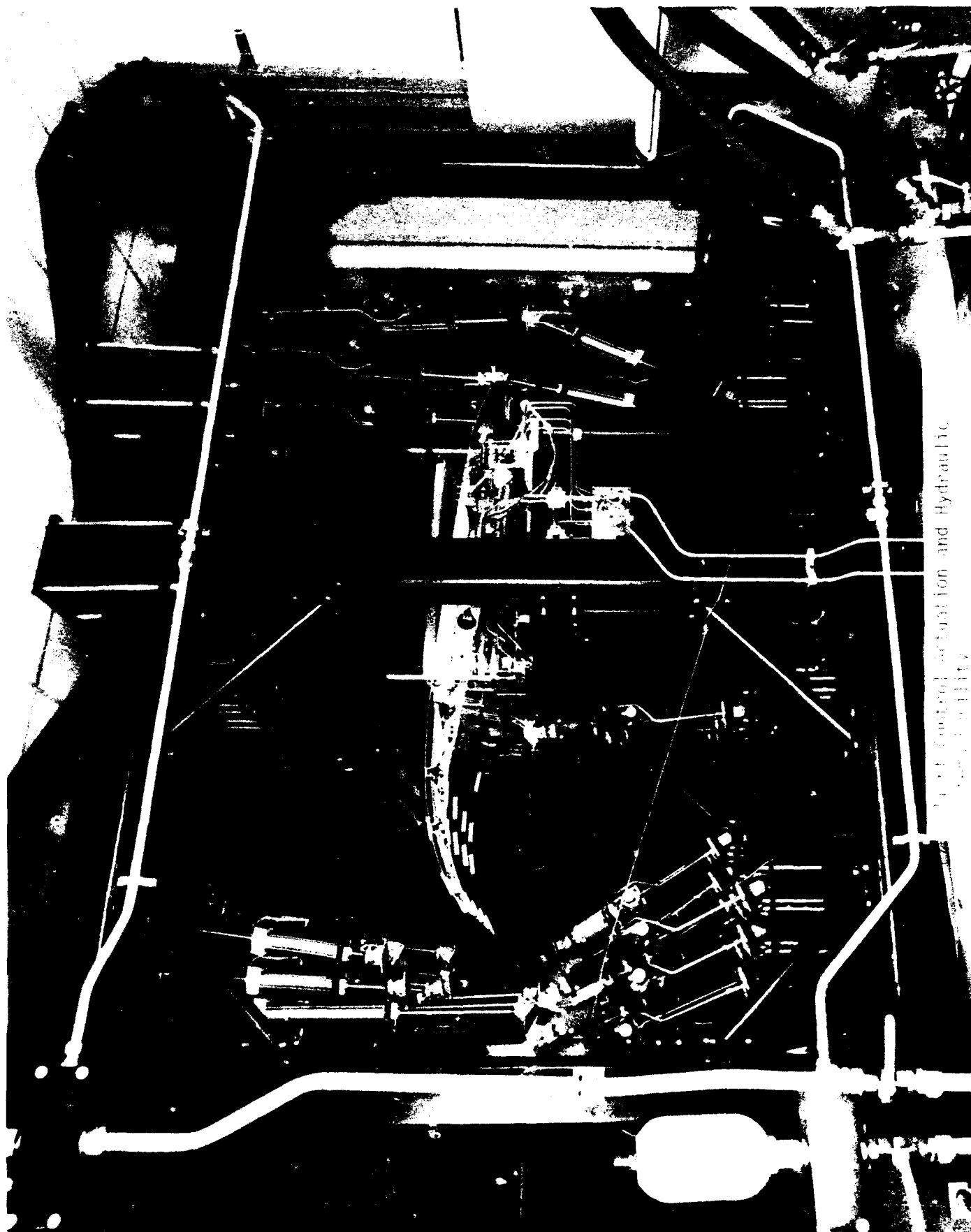
POINT OF CONTACT:

WL/FIGS

WPAFB, OH 45433-6553

(513) 255-2831

DSN 785-2931



Hydraulic Control and Hydraulic
System

FACILITY TYPE:

Unmanned Research Vehicle

PURPOSE:

Low cost/low risk flight test of flight control technologies for manned and unmanned vehicle applications

FACILITY NAME:

Unmanned Research Vehicle (URV) Testbed Facility

PRIMARY CAPABILITIES:

Ground station vehicle and electronics; laboratory development and hotbench systems; experienced flight test team

Two test vehicles (Lambda, Gamma): Lambda: 14' wingspan; 210 lbs (loaded); 15 lbs payload (fixed electronics bay); 18 Hp engine

Gamma: 18 ' wingspan; 475 lbs (loaded); 150 lbs payload (configurable nose); 33 Hp engine

Both: 10 independently commanded control surfaces; tricycle landing gear with brakes and nose wheel steering

SPECIAL/UNIQUE CAPABILITIES:

Functionally powerful/flexible/configurable computational systems

Programmable datalink protocol and data collection/storage

Nose camera video display overlayed with flight data

INSTRUMENTATION:

ON-BOARD: Nose mounted TV camera with downlink; vertical and rate gyros; air data (alpha, beta, airspeed) probe; altimeter; control surface positions;

(cont) magnetometer, engine RPM sensors; multiprocessor control system with MIL-STD-1553 interface

GROUND STATION: flight video/data display; ground station/pilot controls; ground station core computer; Mac II data collection workstation w/optical disk storage

AVAILABILITY:

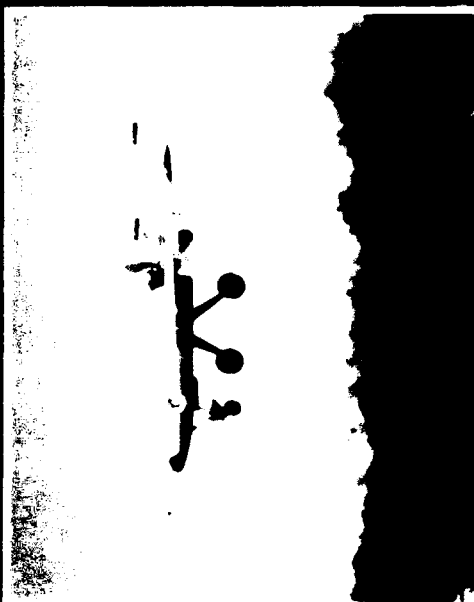
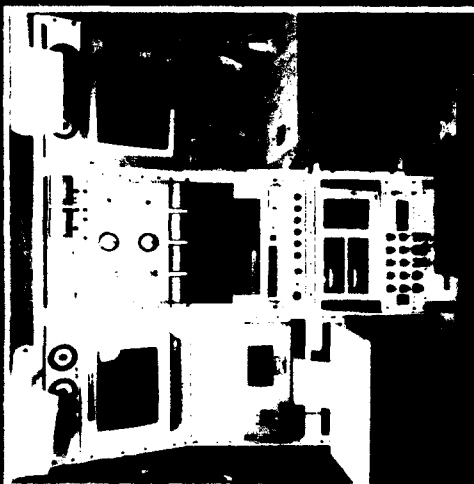
Subject to schedule/funding constraints

LOCATION:

BUILDING: 146 ROOM: 218

POINT OF CONTACT:

WL/FIGS
WPAFB, OH 45433-6553
(513) 255-8288
DSN 785-3012



WL/FIGL
URV Testbed
Facility
 • Affordable
 • Low risk
 • Flexible



FACILITY TYPE:

Aircraft Simulation (NF-16D, Tail Number 86-048)

PURPOSE:

Conduct in-flight simulation

FACILITY NAME:

Variable Stability In-Flight Simulator Test Aircraft
(VISTA)

PRIMARY CAPABILITIES:

Simulate the flying characteristics and cockpit environment of new or existing configurations

Provide test bed aircraft for flight control, pilot-vehicle interface and avionics/flight control integration research programs

SPECIAL/UNIQUE CAPABILITIES:

Response feedback variable stability system capable of five degrees-of-freedom simulation control

Two place cockpit; front seat evaluation cockpit, rear seat safety cockpit; safety monitoring system for reversion back to safety pilot and host F-16 systems

F-16 controls and displays with additional variable feel centerstick in evaluation cockpit

INSTRUMENTATION:

Combination of F-16D block 30 and block 40 avionics

Hawk 32 computers with spare 1553 MUX bus capacity; volume and power available for customer hardware installation

AFFTC Airborne Test Instrumentation System (ATIS); two video recorders

AVAILABILITY:

Available for both in-house and contract test programs

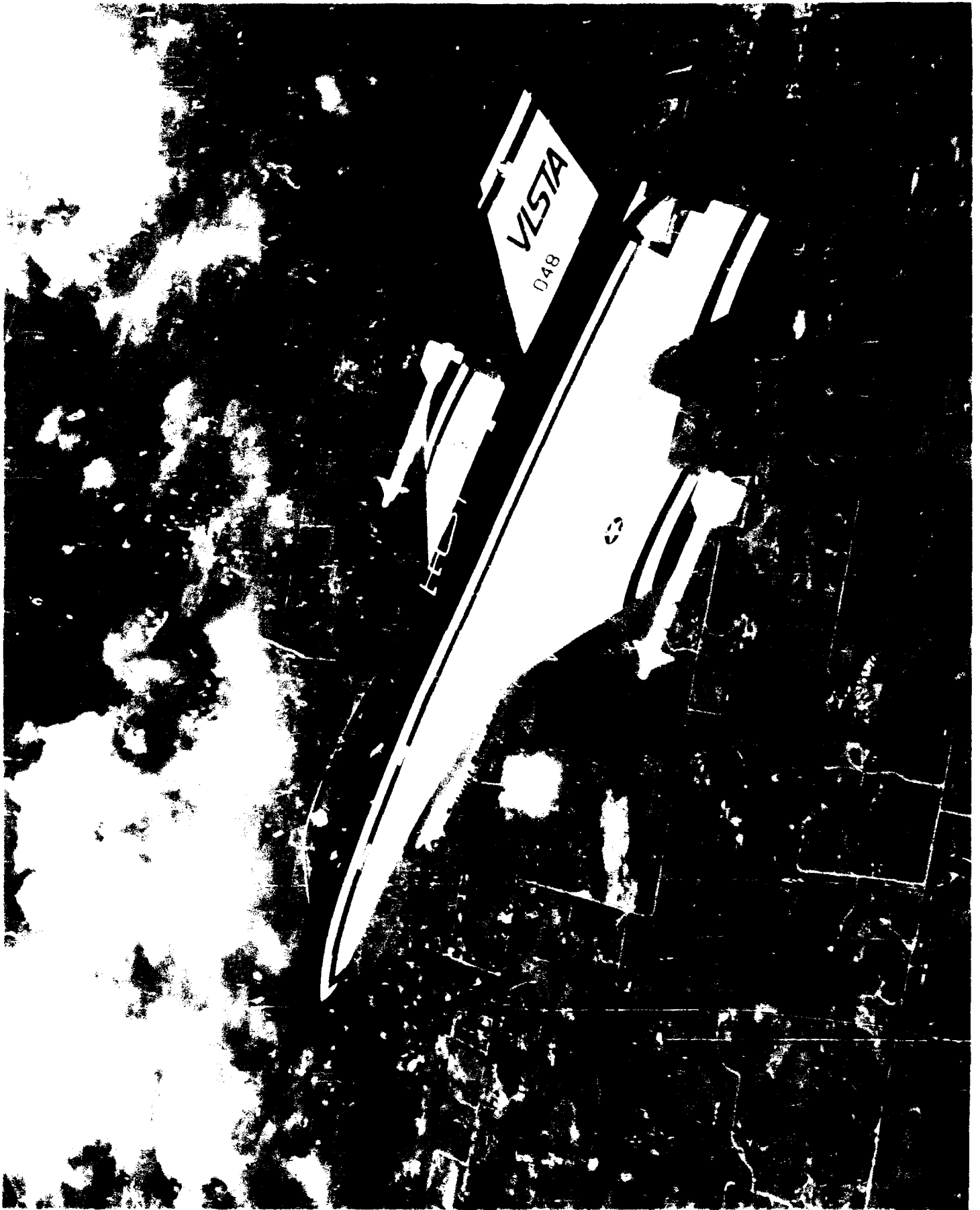
Aircraft available spring of 1993

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/FIGD
WPAFB, OH 45433-6553
(513) 255-8279
DSN 785-8279



FACILITY TYPE:

Wind Tunnel

PURPOSE:

High Mach experiments

FACILITY NAME:

Mach 3, High Reynolds Number Facility

PRIMARY CAPABILITIES:

Uniform Mach 3 flow

Reynolds Number range to 140 million/foot

8 inch by 8 inch test section

SPECIAL/UNIQUE CAPABILITIES:

High Reynolds Number capability

Run times as long as 3 minutes possible

INSTRUMENTATION:

45 channel pressure measuring system; 30 channel thermocouple reference junction system

Flow field probing; flow field measuring capability

Hot-wire measuring capability; Schlieren and two component laser velocimeter available

AVAILABILITY:

Primarily in-house research

Limited U.S. Government agency use

LOCATION:

BUILDING: 456 ROOM: N/A

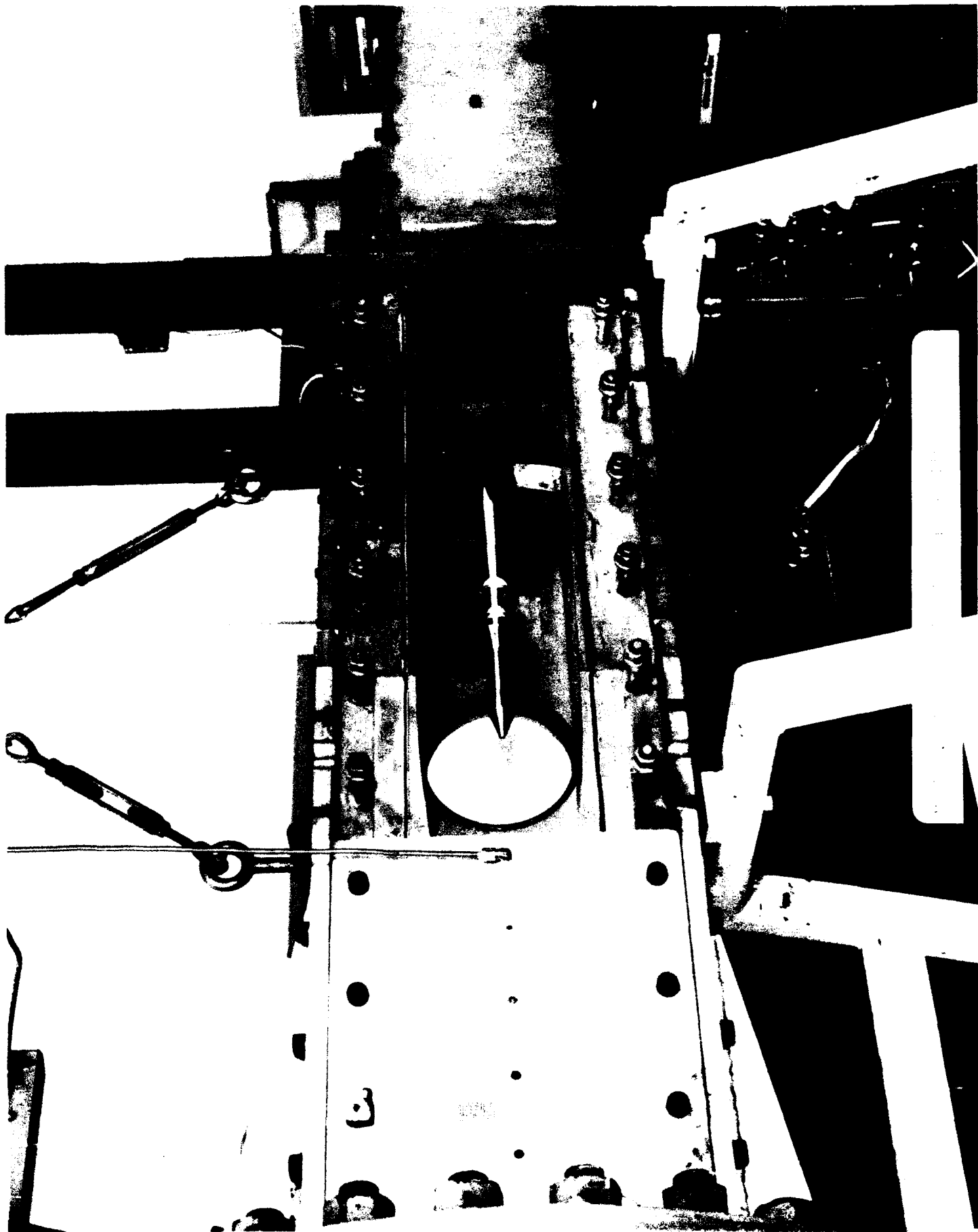
POINT OF CONTACT:

WL/FIMG

WPAFB, OH 45433-6553

(513) 255-5806

DSN 785-5806



FACILITY TYPE:

Wind Tunnel

PURPOSE:

High Mach experiments

FACILITY NAME:

Mach 6, High Reynolds Number Facility

PRIMARY CAPABILITIES:

12 inch diameter open jet test section

Uniform Mach 6 flow

Reynolds Number range to 30 million/foot

Simulate flight conditions from 30,000 ft to 130,000 ft

SPECIAL/UNIQUE CAPABILITIES:

Run duration to 4 minutes at low Reynolds Number condition

Run duration of 2 to 3 minutes per day at high Reynolds Number condition

Schlieren and two component laser velocimeter systems available

INSTRUMENTATION:

45 channel pressure measuring system, 30 channel thermocouple reference junction system

Three dimensional flow field probing; two ranges of 6 component force balances available

128 channel data acquisition system capable of sampling all channels up to 10 times/second

AVAILABILITY:

Primarily in-house research

Limited U.S. Government agency use

LOCATION:

BUILDING: 456 ROOM:

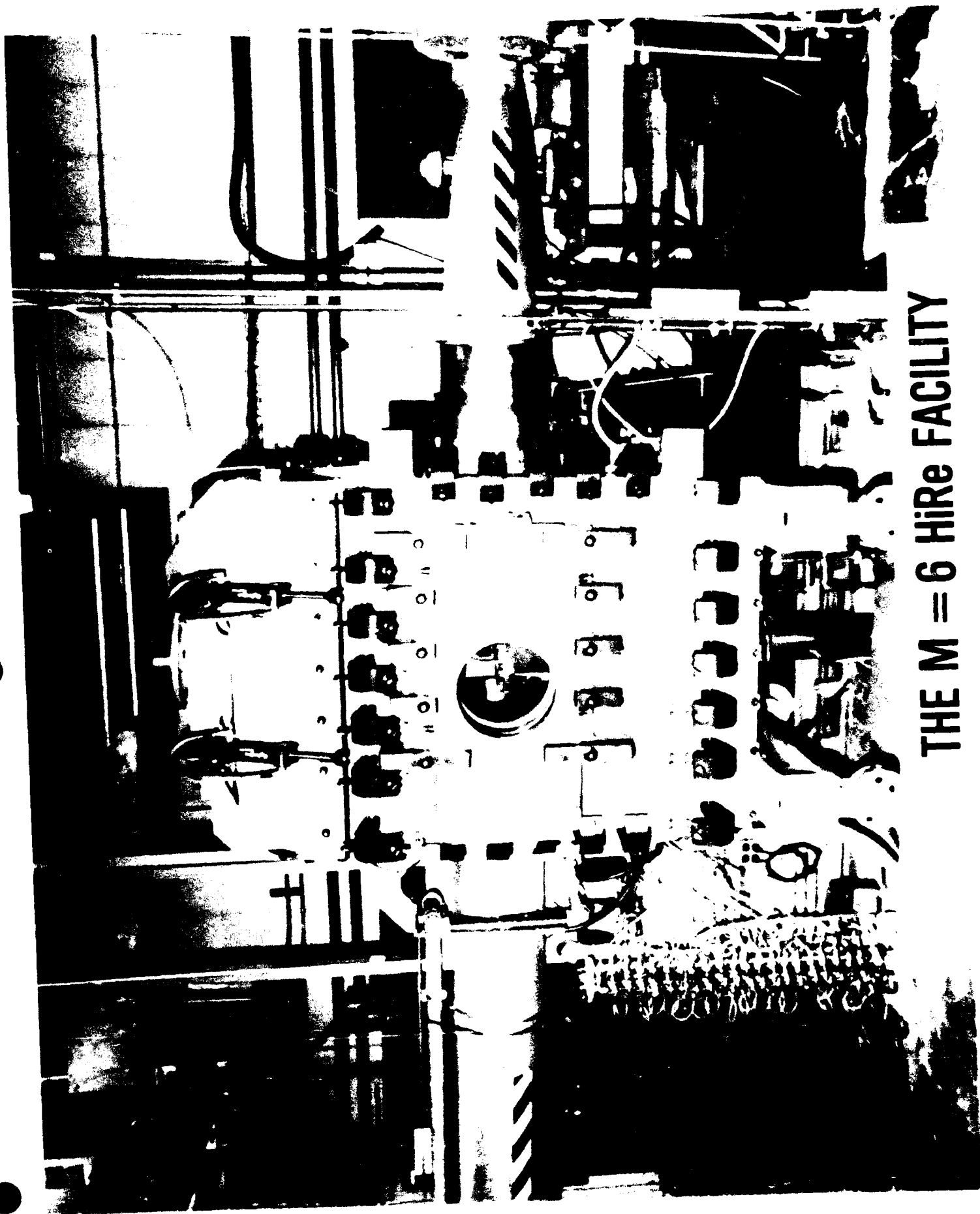
POINT OF CONTACT:

WL/FIMG

WPAFB, OH 45433-6553

(513) 255-5806

DSN 785-5806



THE M = 6 HIRe FACILITY

FACILITY TYPE:

Wind Tunnel

PURPOSE:

High Mach experiments

FACILITY NAME:

Twenty Inch Hypersonic Wind Tunnel

PRIMARY CAPABILITIES:

20 inch open jet test section

Uniform Mach 12 or Mach 14 flow

Reynolds Number range to 1 million/foot

Simulate flight conditions from 120,000 to 150,000 feet

SPECIAL/UNIQUE CAPABILITIES:

Run times from 5 to 8 minutes, several per day

INSTRUMENTATION:

45 channel pressure measuring system

30 channel thermocouple reference junction system

128 channel test data read-out capability

AVAILABILITY:

Primarily in-house research

Limited U.S. Government agency use

LOCATION:

BUILDING: 450 ROOM: C08

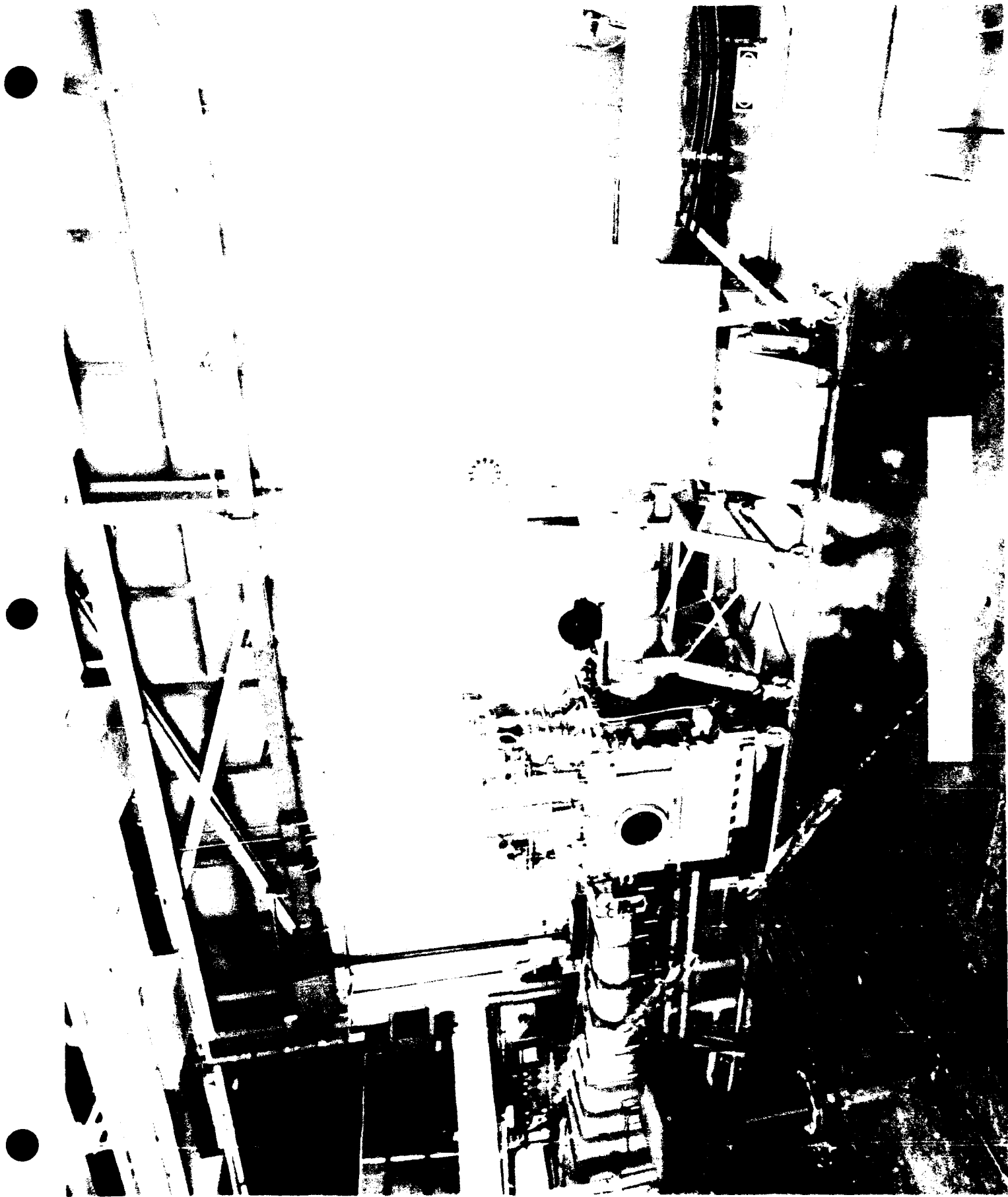
POINT OF CONTACT:

WL/FIMG

WPAFB, OH 45433-6553

(513) 255-5806

DSN 785-5806



FACILITY TYPE:

Water Tunnel

PURPOSE:

Enhanced flow visualization experiments

FACILITY NAME:

Hydrodynamic Test Facility

PRIMARY CAPABILITIES:

2 foot by 2 foot test section, 4 feet in length

Velocity range: 0.10 to 0.85 ft/sec continuous

Velocity range of .10 to .30 ft/sec provides optimum flow visualization when using dye-injection method

SPECIAL/UNIQUE CAPABILITIES:

Water medium enhances flow visualization

Three walls of test section are plexiglass for optimum viewing

INSTRUMENTATION:

Laser Doppler velocitimeter

Laser-light sheet with forward looking photographic system

Multiple colored dye-injection capability; fluorescent dye capability

AVAILABILITY:

Primarily in-house research

Limited U.S. Government agencies and Government contractors

LOCATION:

BUILDING: 25A ROOM:

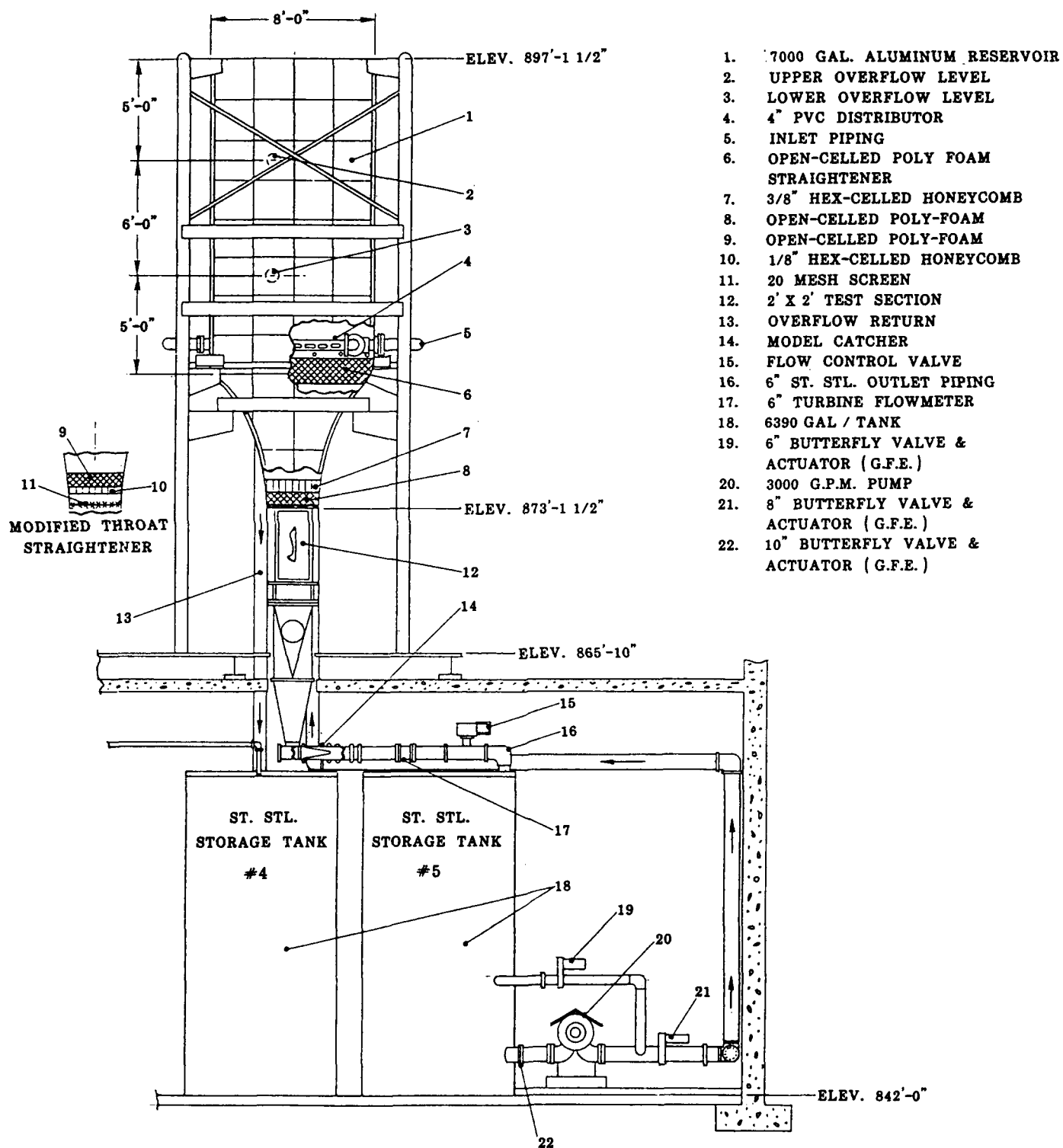
POINT OF CONTACT:

WL/FIMM

WPAFB, OH 45433-6553

(513) 255-4579

DSN 785-4579



1. 7000 GAL. ALUMINUM RESERVOIR
2. UPPER OVERFLOW LEVEL
3. LOWER OVERFLOW LEVEL
4. 4" PVC DISTRIBUTOR
5. INLET PIPING
6. OPEN-CELLED POLY FOAM STRAIGHTENER
7. 3/8" HEX-CELLED HONEYCOMB
8. OPEN-CELLED POLY-FOAM
9. OPEN-CELLED POLY-FOAM
10. 1/8" HEX-CELLED HONEYCOMB
11. 20 MESH SCREEN
12. 2' X 2' TEST SECTION
13. OVERFLOW RETURN
14. MODEL CATCHER
15. FLOW CONTROL VALVE
16. 6" ST. STL. OUTLET PIPING
17. 6" TURBINE FLOWMETER
18. 6390 GAL / TANK
19. 6" BUTTERFLY VALVE & ACTUATOR (G.F.E.)
20. 3000 G.P.M. PUMP
21. 8" BUTTERFLY VALVE & ACTUATOR (G.F.E.)
22. 10" BUTTERFLY VALVE & ACTUATOR (G.F.E.)

Hydrodynamic Test Facility

FACILITY TYPE:

Wind Tunnel

PURPOSE:

Closed circuit, continuous flow, variable density wind tunnel experiments

FACILITY NAME:

Trisonic Gasdynamics Facility

PRIMARY CAPABILITIES:

Mach range from 0.23 to 1.2, 1.5, 1.9, 2.3, and 3.0

Reynolds Number range from 1 million/foot to 6 million/foot

Two foot square test section (15 inch square for Mach Number 0.85 to 1.2)

Schlieren capability

SPECIAL/UNIQUE CAPABILITIES:

Multi-Mach Number capability; 3D laser velocimeter available; laser light sheet

Dynamic pressures to 1,000 psf supersonic, 1,400 psf transonic

Constant test temperature; secondary air system

INSTRUMENTATION:

Pressure measuring capability, force measuring capability

Laser flow visualization, flow field probing capability

Fully automated data support

AVAILABILITY:

Primarily in-house research

Limited U.S. Government agency and Government contractors

LOCATION:

BUILDING: 26 ROOM:

POINT OF CONTACT:

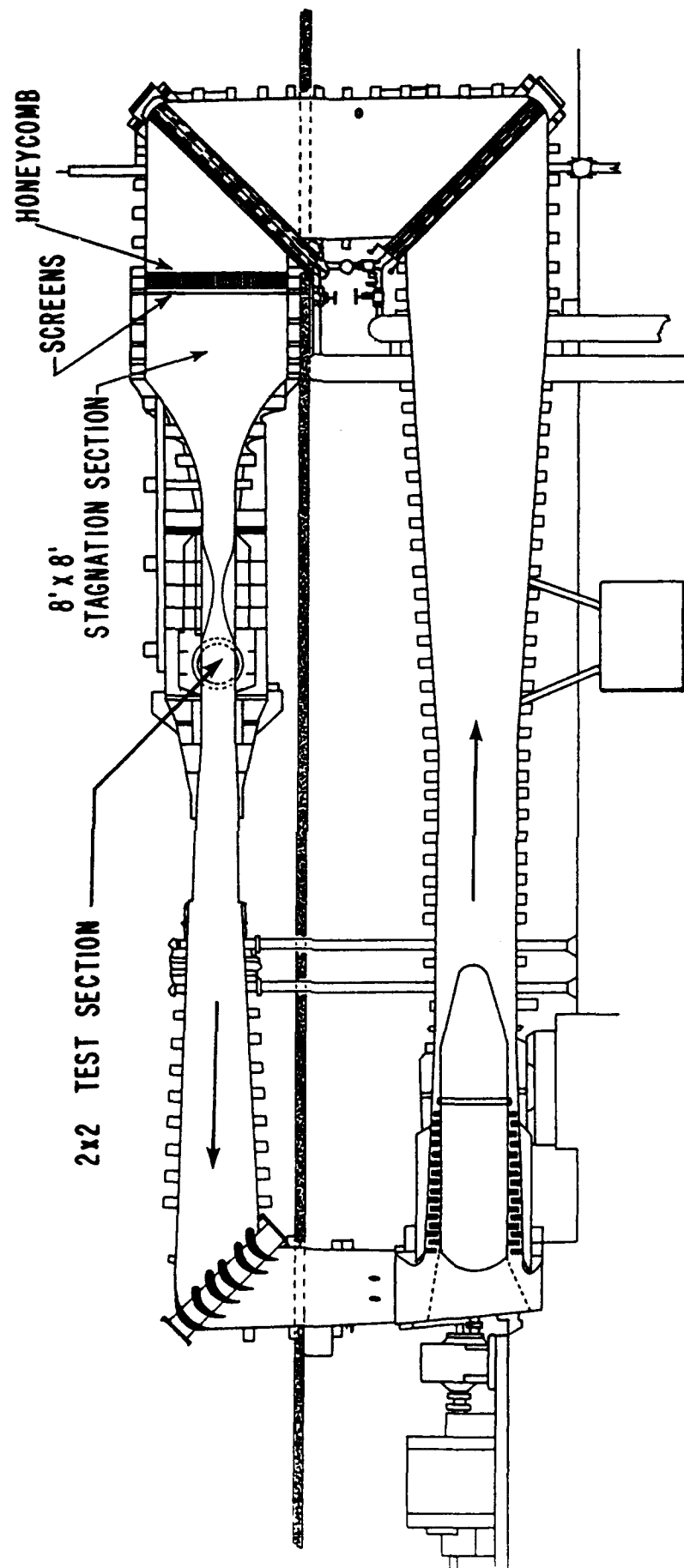
WL/FIMM

WPAFB, OH 45433-6553

(513) 255-4579

DSN 785-4579

PERFORMANCE RANGE
 P_o - 200 TO 4,000 PSF
 M - .05 TO 3.0



FACILITY TYPE:

Wind Tunnel

PURPOSE:

Parachute and free-falling body experiments

FACILITY NAME:

Vertical Wind Tunnel

PRIMARY CAPABILITIES:

Mach range: 0 to 0.14; Reynolds Number ($\times 10^{exp6/ft}$): 0 to 0.91; total pressure (psia): atmospheric; run time: continuous

12 foot diameter open jet test section; dynamic pressure (psf): 0 to 26; total temperature (degR): ambient

Atmospheric tunnel

SPECIAL/UNIQUE CAPABILITIES:

Free-fall training capability

Sub-munitions decelerator testing

Sting balance capable of 6-component measurements available

INSTRUMENTATION:

Pressure measuring capability

Force measuring capability; drag measuring capability

Motion picture and still photographic coverage available

AVAILABILITY:

Limited U.S. Government agency and Government contractor use

LOCATION:

BUILDING: 27 ROOM:

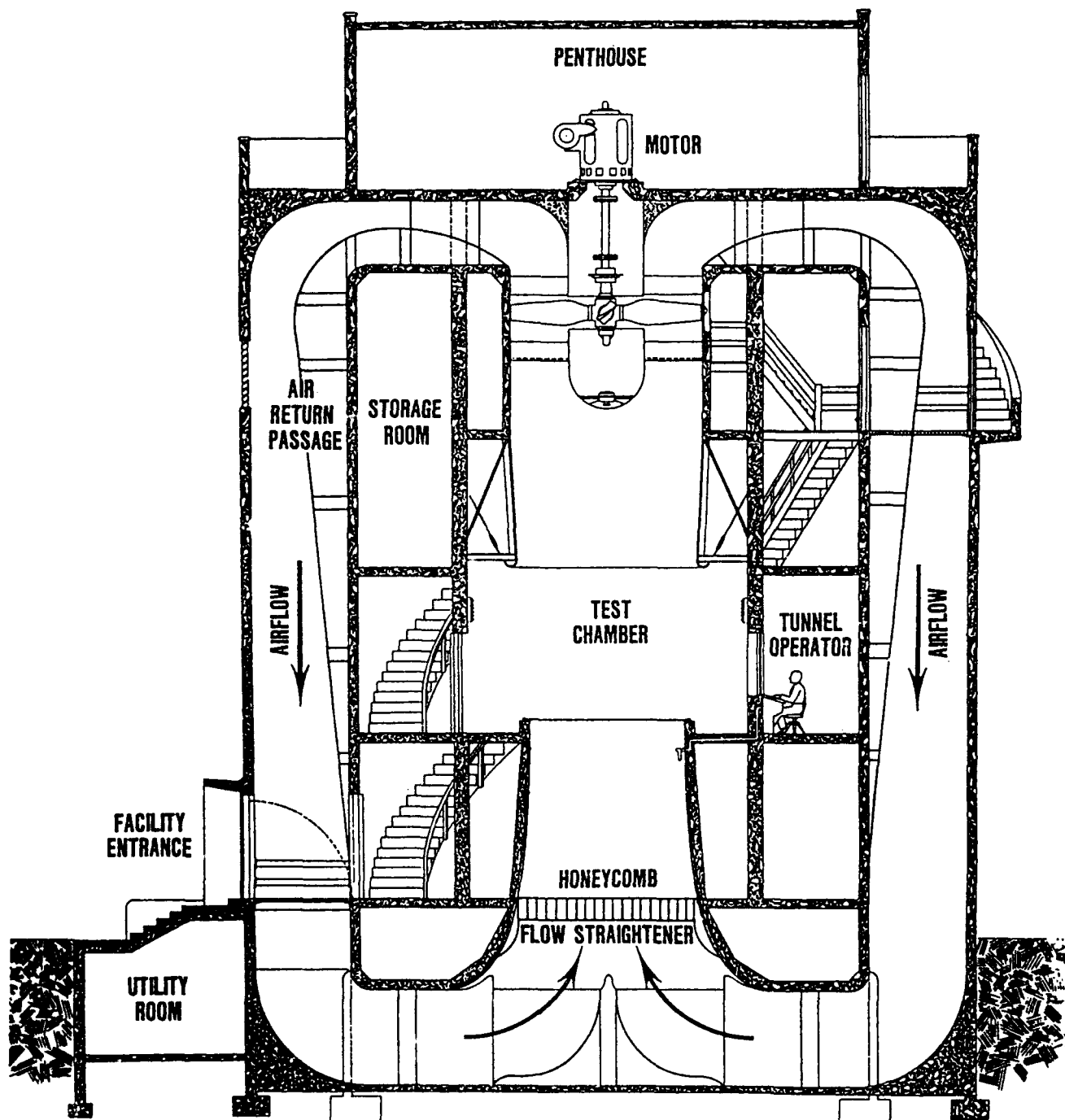
POINT OF CONTACT:

WL/FIMM

WPAFB, OH 45433-6553

(513) 255-4579

DSN 785-4579



VERTICAL WIND TUNNEL
WRIGHT-PATTERSON AIR FORCE BASE

FACILITY TYPE:

Wind Tunnel

PURPOSE:

Maximum subsonic flow visualization

FACILITY NAME:

Subsonic Aerodynamic Research Laboratory (SARL)

PRIMARY CAPABILITIES:

Mach range from 0.2 to 0.5

Atmospheric tunnel

10 ft by 7 ft test section

SPECIAL/UNIQUE CAPABILITIES:

High angle of attack testing capability; very low turbulence

Enhanced flow visualization capability (55% = optical plexiglass); very large force measuring capability

Capable of testing power-simulated vehicles; secondary air source

INSTRUMENTATION:

Force measuring capabilities; laser light sheet

Pressure measuring capabilities; automated data system

Flow field probing

AVAILABILITY:

Primarily in-house research

Limited U.S. Government agency use, and government contractors

LOCATION:

BUILDING: 25C ROOM:

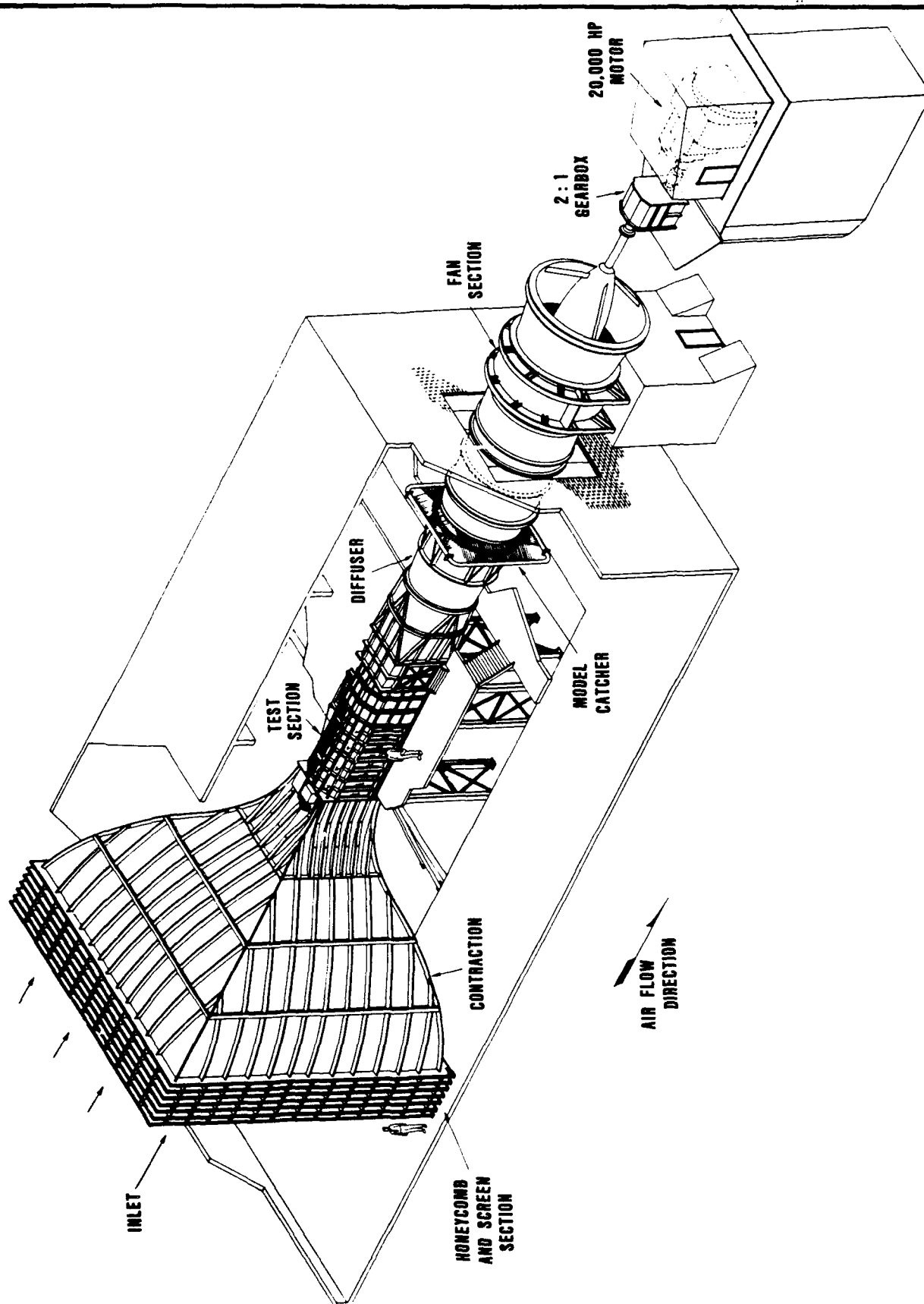
POINT OF CONTACT:

WL/FIMN

WPAFB, OH 45433-6553

(513) 255-4579

DSN 785-4579



Subsonic Aerodynamic Research Lab (SARL)

FACILITY TYPE:

Pilot-Vehicle Interface (PVI) Design

PURPOSE:

Conduct evaluations of advanced fighter aircraft PVI controls and displays for air-to-air and air-to-ground missions

FACILITY NAME:

Fighter Aircraft Cockpit: Single-Seat Strike Fighter (S3F)

PRIMARY CAPABILITIES:

Evaluate advanced fighter PVI concepts and designs through part-task, representative-task, and part-mission experiments

Two dynamic mockups provide representation of a flight element operating within a numerically superior, hostile/threat environment

SPECIAL/UNIQUE CAPABILITIES:

Rapid prototyping of the control and display concepts provides quick turnaround for each evaluation

Residing software environment allows quick integration of hardware and software packages developed outside of Wright Lab into the existing equipment network

INSTRUMENTATION:

Silicon Graphics workstations sharing data via Ethernet and SCRAMnet fiber optic shared memory networks

Various cockpit input modalities are available, including stick, throttle, stick- and throttle-mounted switches, touchsensitive display overlays

(cont) and programmable display pushbuttons

AVAILABILITY:

Primarily in-house research

Available to US Government agencies

LOCATION:

BUILDING: 146 ROOM: 114

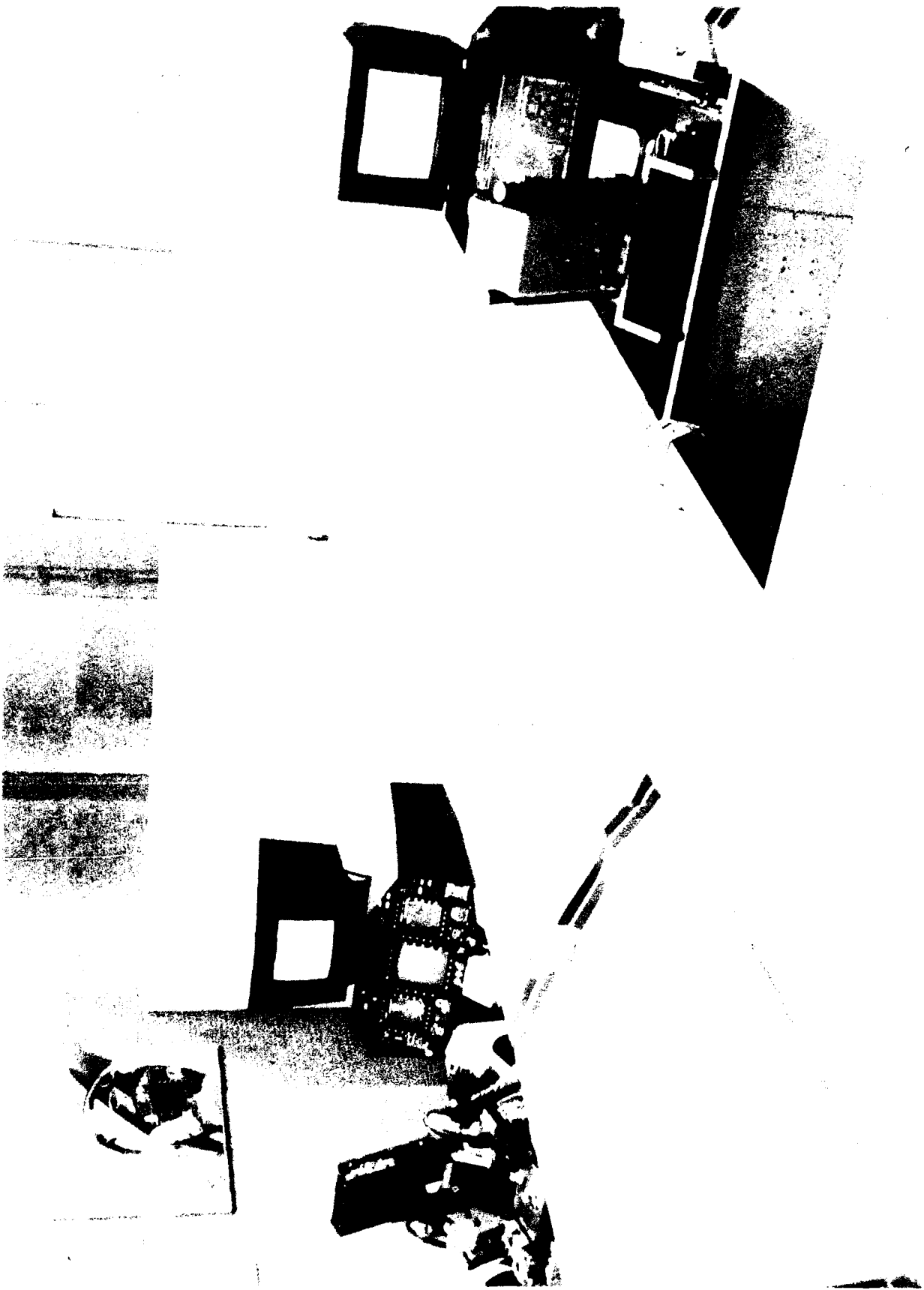
POINT OF CONTACT:

WL/FIP

WPAFB, OH 45433-6553

(513) 255-6670

DON 785-6670



Fighter Aircraft Cockpit: Single-Seat Strike Fighter (S3F)

FACILITY TYPE:

Crew Systems Integration

PURPOSE:

Design and test advanced concepts for future aircraft

FACILITY NAME:

Microprocessor Applications of Graphics and Interactive Communication (MAGIC)

PRIMARY CAPABILITIES:

Aid in future cockpit design

Evaluate advanced technologies for cockpit use

Evaluate pilot - vehicle interface concepts

SPECIAL/UNIQUE CAPABILITIES:

Computer generated stereoscopic three dimension (3D) displays; generic voice input/output capability

Programmable display switches; touch-sensitive overlays on display monitors

Voice activation of cockpit systems; new HUD/HDD
Symbology for Unusual Attitude Recovery

INSTRUMENTATION:

Compaq 386/20e computers with 387 math

Silicon graphics IRIS 4D workstation

Ethernet communication network

AVAILABILITY:

Primarily in-house research

Available to US Government agencies

LOCATION:

BUILDING: 146 ROOM: 114

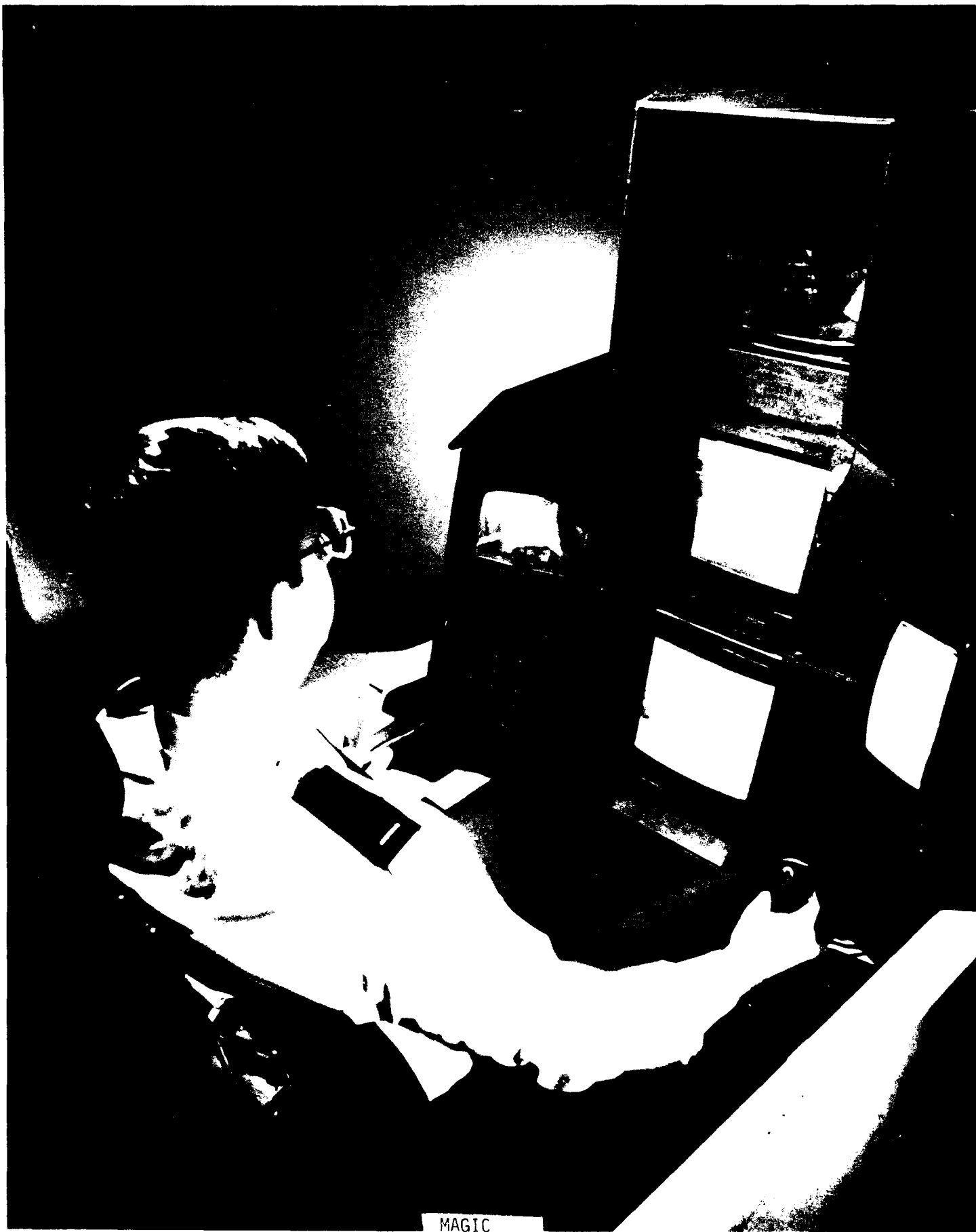
POINT OF CONTACT:

WL/FIP

WPAFB, OH 45433-6553

(513) 255-8260

DSN 785-8260



FACILITY TYPE:

Crew Station Design

PURPOSE:

Conduct advanced fighter cockpit control/display evaluations

FACILITY NAME:

Panoramic Cockpit Control and Display System (PCCADS)

PRIMARY CAPABILITIES:

Aid in future cockpit design

Evaluate advanced control/display concepts

SPECIAL/UNIQUE CAPABILITIES:

21" x 16" display area with touch sensitive overlay, high resolution graphics and 3-D display capability

Voice activation of cockpit systems; out-of-window scene

Hands-on-throttle-and-stick (HOTAS) system; head tracking capability with simulated helmet mounted sight

INSTRUMENTATION:

Silicon Graphics IRIS 4D/420VGX, 4D/320S

Zenith Z-150; ethernet communication network; esprit video projector

AVAILABILITY:

In-house research

Available to US Government agencies

LOCATION:

BUILDING: 146 ROOM: 114

POINT OF CONTACT:

WL/FIP

WPAFB, OH 45433-6553

(513) 255-6670

DSN 785-6670



Panoramic Cockpit Control and Display System

FACILITY TYPE:

Crew Station Design

PURPOSE:

Conduct advanced transport crew station control/display evaluations

FACILITY NAME:

Transport Aircraft Cockpit (TRAC)

PRIMARY CAPABILITIES:

Support evaluation of advanced transportation crew station designs through part and full mission simulation studies

Dynamic mockup

SPECIAL/UNIQUE CAPABILITIES:

Rapid prototyping of advanced control/display concepts

INSTRUMENTATION:

Silicone graphics IRIS 4D workstations networked together

AVAILABILITY:

Primarily in-house research

Available to U.S. Government agencies and contractors

LOCATION:

BUILDING: 146 ROOM: 114

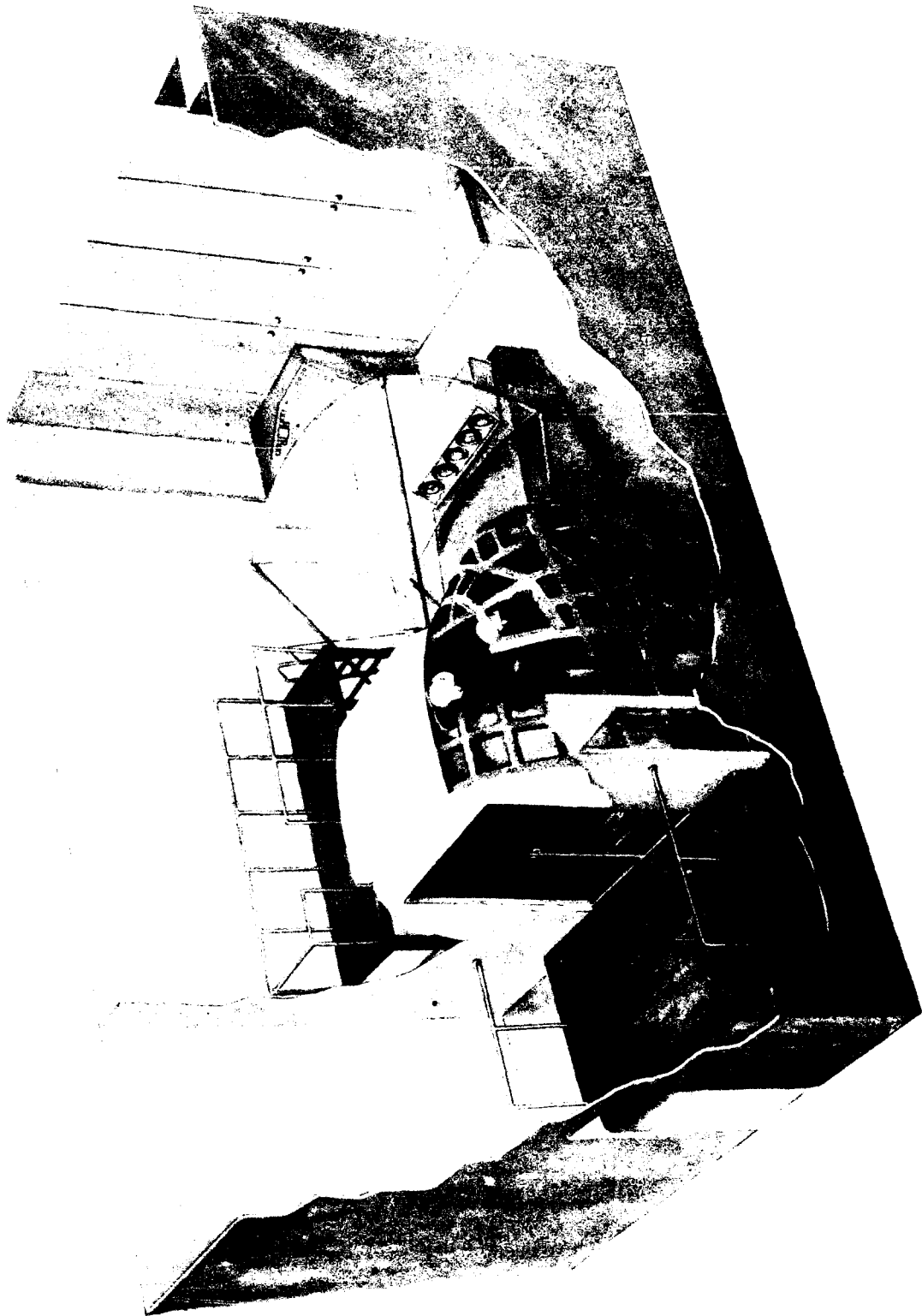
POINT OF CONTACT:

WL/FIP

WPAFB, OH 45433-6553

(513) 255-8260

DSN 785-8260



Transport Aircraft Cockpit (TRAC)

FACILITY TYPE:

Research

PURPOSE:

Investigate induced damage and/or fracture of the micro-scale structures typically used in the design and construction of avionics systems

FACILITY NAME:

Integrated Electronics Environmental Laboratory

PRIMARY CAPABILITIES:

Vibration, thermal cycling and combined environments testing of micro-scale structures typical of modern electronics assemblies

SPECIAL/UNIQUE CAPABILITIES:

Capability to measure the response of micro-scale elements to vibration and/or thermal cycling environmental stresses

INSTRUMENTATION:

Differential laser vibrometer which measures the relative displacements of micro-scale structures with a resolution of 0.5 microns

AVAILABILITY:

Primarily in-house research

Limited U.S. Government agency use

LOCATION:

BUILDING: 45 ROOM: Annex

POINT OF CONTACT:

WL/FIVE

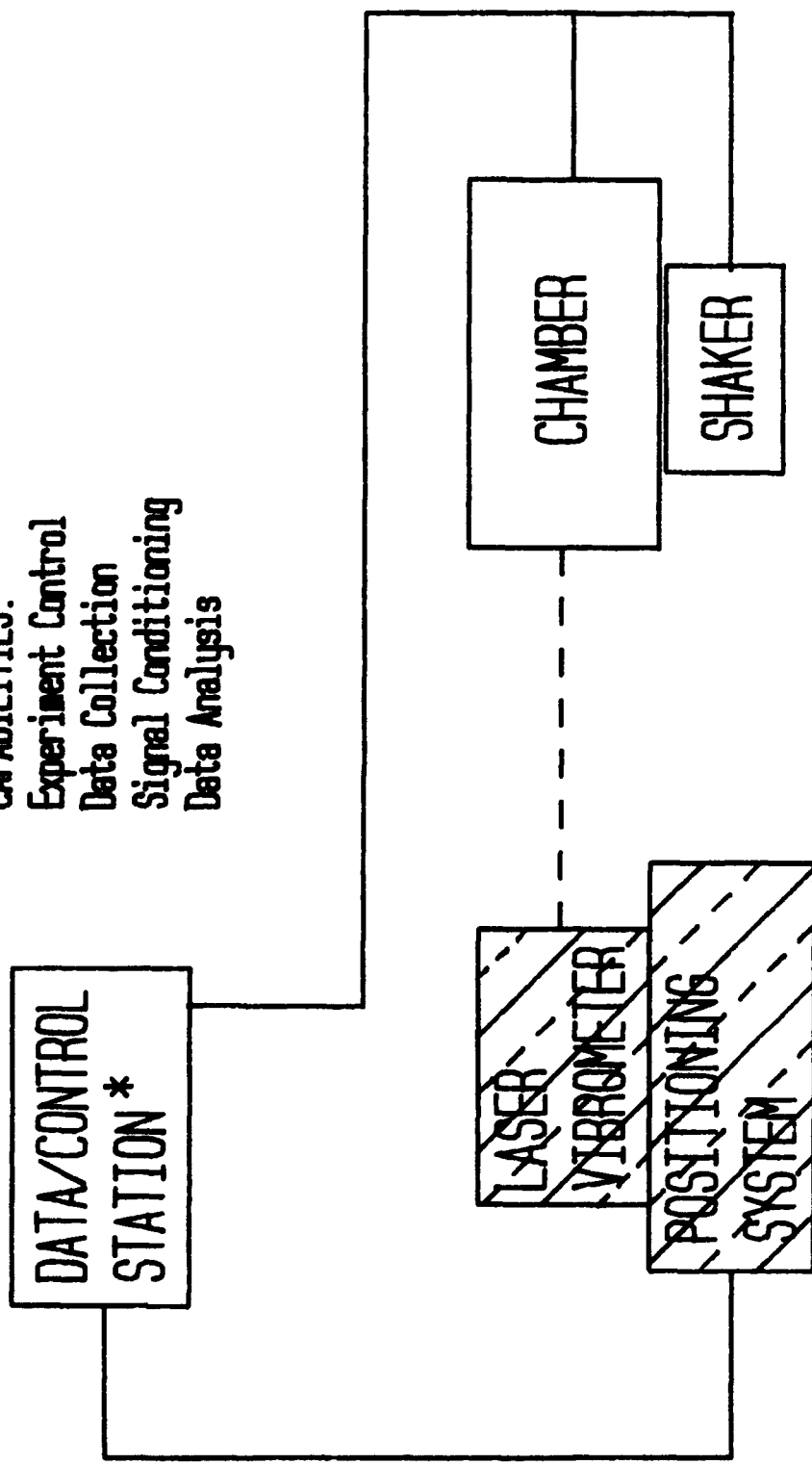
WPAFB, OH 45433-6553

(513) 255-3021

DSN 785-3021

INTEGRATED ELECTRONICS ENVIRONMENTAL TEST LAB

- * CAPABILITIES:**
- Experiment Control
 - Data Collection
 - Signal Conditioning
 - Data Analysis



 PROCUREMENT PRESENTLY FUNDED

FACILITY TYPE:

Research

PURPOSE:

Investigate induced and/or fracture of macro/micro scale structures typically used in the design and construction of aircraft systems

FACILITY NAME:

Thermal and Vibration Laboratory (TAVLAB)

PRIMARY CAPABILITIES:

Combined temperature and vibration, low heat flux (<35 btu/ft²-sec), and laser vibrometer testing of macro/micro scale structures typical of modern

(cont) aircraft assemblies

SPECIAL/UNIQUE CAPABILITIES:

Capability to measure the response of macro/micro scale elements to vibration and/or thermal cycling environmental stresses

INSTRUMENTATION:

Differential laser vibrometer which measures the relative displacements of macro/micro scale structures with resolution of 0.5 microns

Combined temperature (-100 to +350 degF) and vibration (6000 lbf) testing

Six (6) KW quartz lamps for low heat flux testing

AVAILABILITY:

Primarily in-house research

Limited US Government agency use

LOCATION:

BUILDING: 45 ROOM: Annex

POINT OF CONTACT:

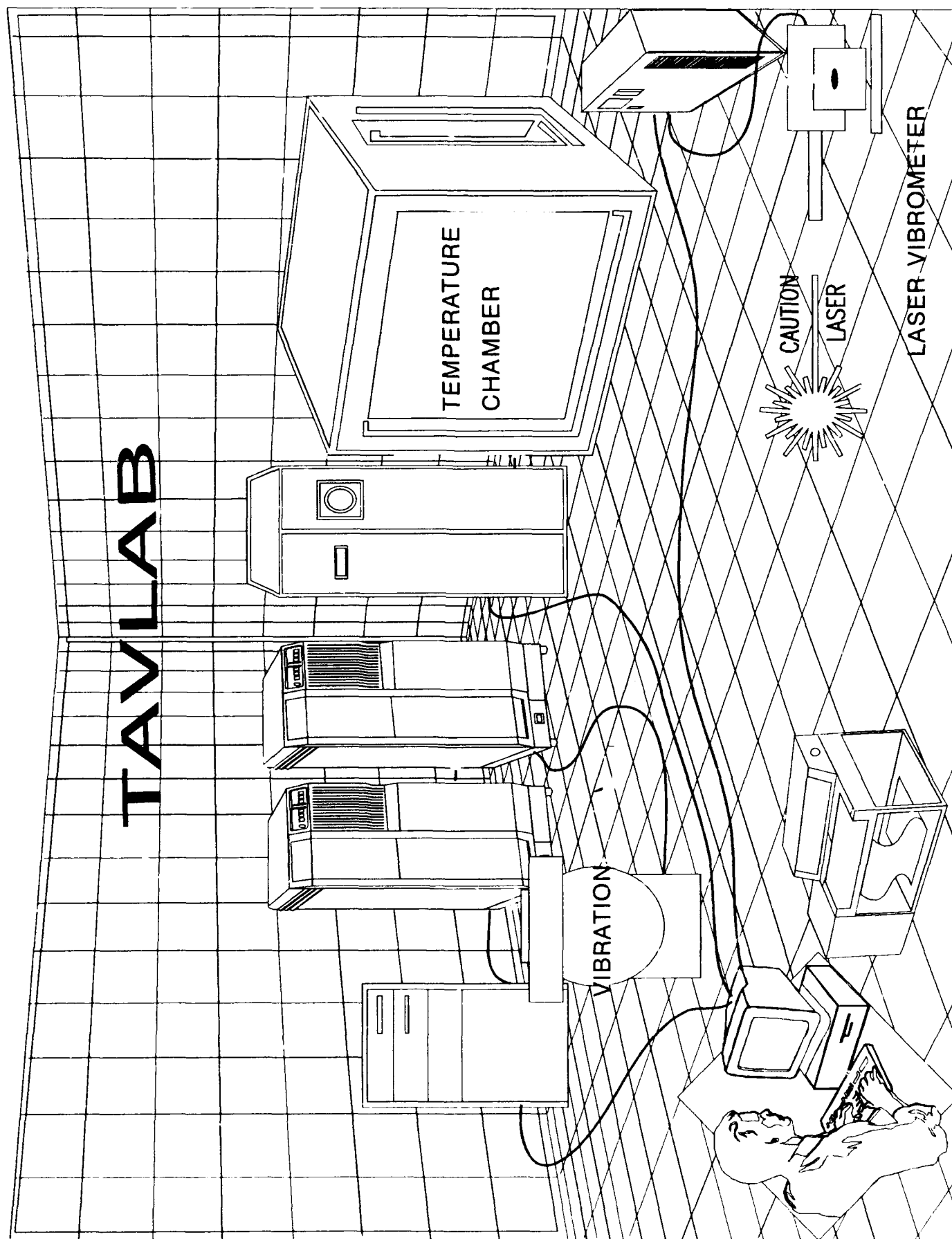
WL/FIVE

WPAFB, OH 45433-6553

(513) 255-0251

DSN 785-0251

TAVILAB



FACILITY TYPE:

Landing Gear

PURPOSE:

Perform functional and qualification tests on landing gear assemblies and component hardware

FACILITY NAME:

DOD Landing Gear Development Facility

PRIMARY CAPABILITIES:

Aircraft tire/wheel testing: 350 mph top speed 150 k-lb max load + 20 deg yaw and camber

Aircraft brake/wheel/tire testing: 200 mph top speed, 350k - lb max load, 220 M ft lbs max energy

Load tension/compression: 1 M lb tension, 3 M lb compression

SPECIAL/UNIQUE CAPABILITIES:

Only test facility currently capable of simulating runway bomb repairs in testing landing gears

INSTRUMENTATION:

Measurement of all standard parameters associated with landing gear and/or component testing

Real time data processing on PDP-11 and PC based systems; off-line data processing capabilities on PCs and UNIX VAX

Computer data output can be reformatted to any other industry recognized standard format

AVAILABILITY:

Available to U.S. Government agencies and contractors

Available to industry

LOCATION:

BUILDING: 31 ROOM: Gr Fl

POINT OF CONTACT:

WL/FIVM

WPAFB, OH 45433-6553

(513) 255-2663

DSN 785-2663

FACILITY TYPE:

Launch and Recovery Subsystems

PURPOSE:

Examine ways of improving existing launch and recovery subsystems through application of latest technological innovations

FACILITY NAME:

Mobility Development Laboratory

PRIMARY CAPABILITIES:

Dynamic Test Machine - whirling arm capable of testing subsystems, mainly landing gear, through all phases of launch and recovery

Static Test Platform - table to hold model and overhead support structure to lift and hold model during tests

SPECIAL/UNIQUE CAPABILITIES:

Dynamic Test Machine: max model weight - 1000 lbs;
speed range - 1 to 70 fps; max acceleration - + 8 fps²

Static Test Platform load capacity: platform - 7,500 lbs, hoist - 10,000 lbs, winch - 5,000 lbs

INSTRUMENTATION:

20 channel measurement capability

Automatic Data Acquisition and Control System - provides rapid test analysis immediately after test is done

Pressure transducers around model to determine airflow pattern around vehicle

AVAILABILITY:

Primarily in-house research

Available to all DOD agencies and industry contractors

LOCATION:

BUILDING: 255C ROOM:

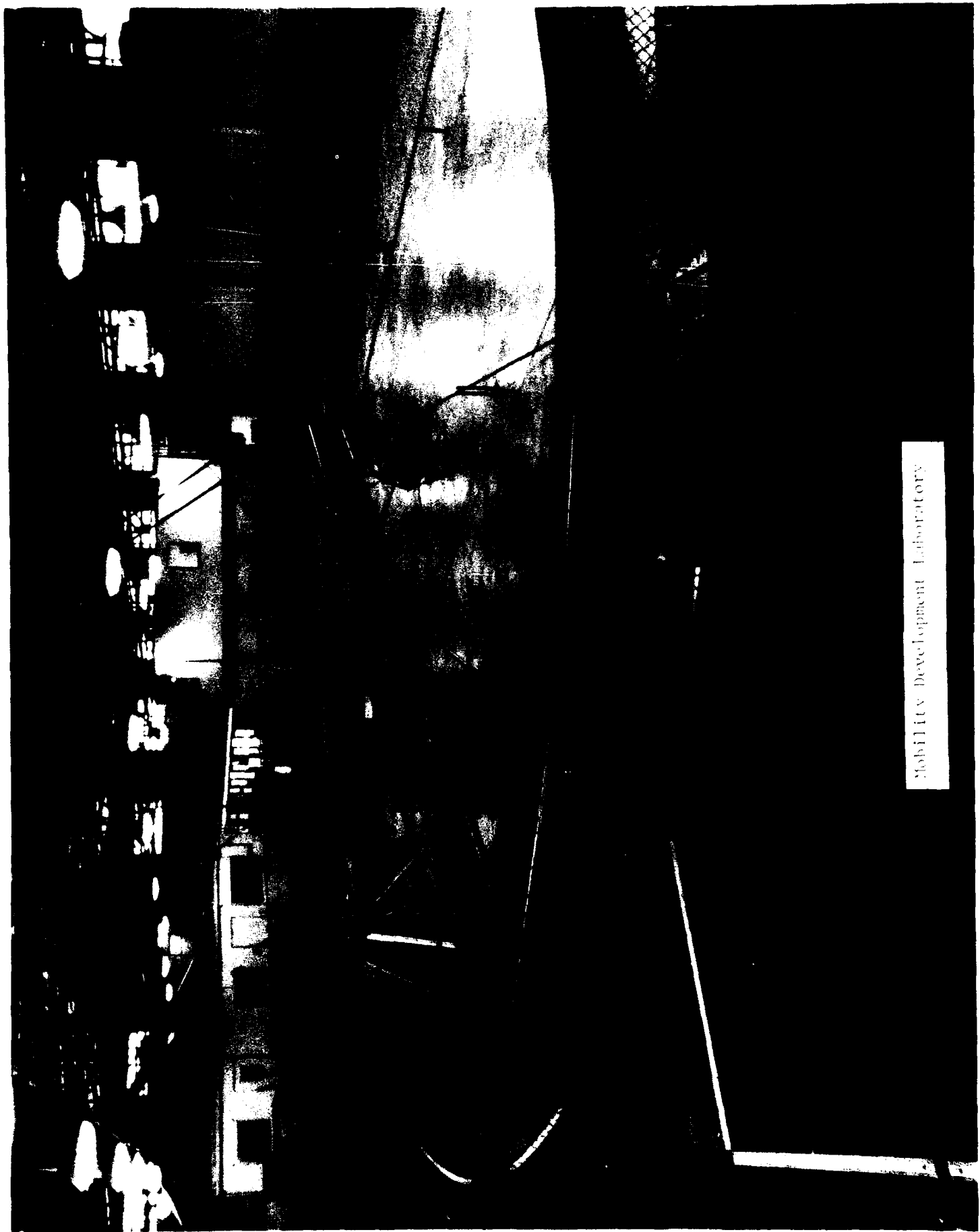
POINT OF CONTACT:

WL/FIVM

WPAFB, OH 45433-6553

(513) 257-2129

DSN 787-2129



Mobility Development Laboratory

FACILITY TYPE:

Research

PURPOSE:

Investigate technologies which lead to aircraft transparencies which meet mission needs

FACILITY NAME:

Aircraft Transparency Durability Research Facility
(ATDRF)

PRIMARY CAPABILITIES:

Explore, develop, integrate, and demonstrate technologies enabling design, fabrication, test, and operational support of aircraft transparency subsystems

(cont) which meet aircraft mission performance and supportability requirements

Transition these technologies to Air Force centers for aircraft development, acquisition and logistics support

Simulated pressure and thermal flight and flightline environments for aircraft transparency subsystems

SPECIAL/UNIQUE CAPABILITIES:

Capability to measure the response of an aircraft transparency subsystem to cyclic pressure and thermal inputs

INSTRUMENTATION:

Transducers to measure pressure in the cockpit, thermocouples to measure temperature in the working loops and on the inner and outer windshield surfaces

Video cameras located inside the cockpit to detect catastrophic failure

Still photographic documentation also provided to record exposure events

AVAILABILITY:

Primarily in-house research

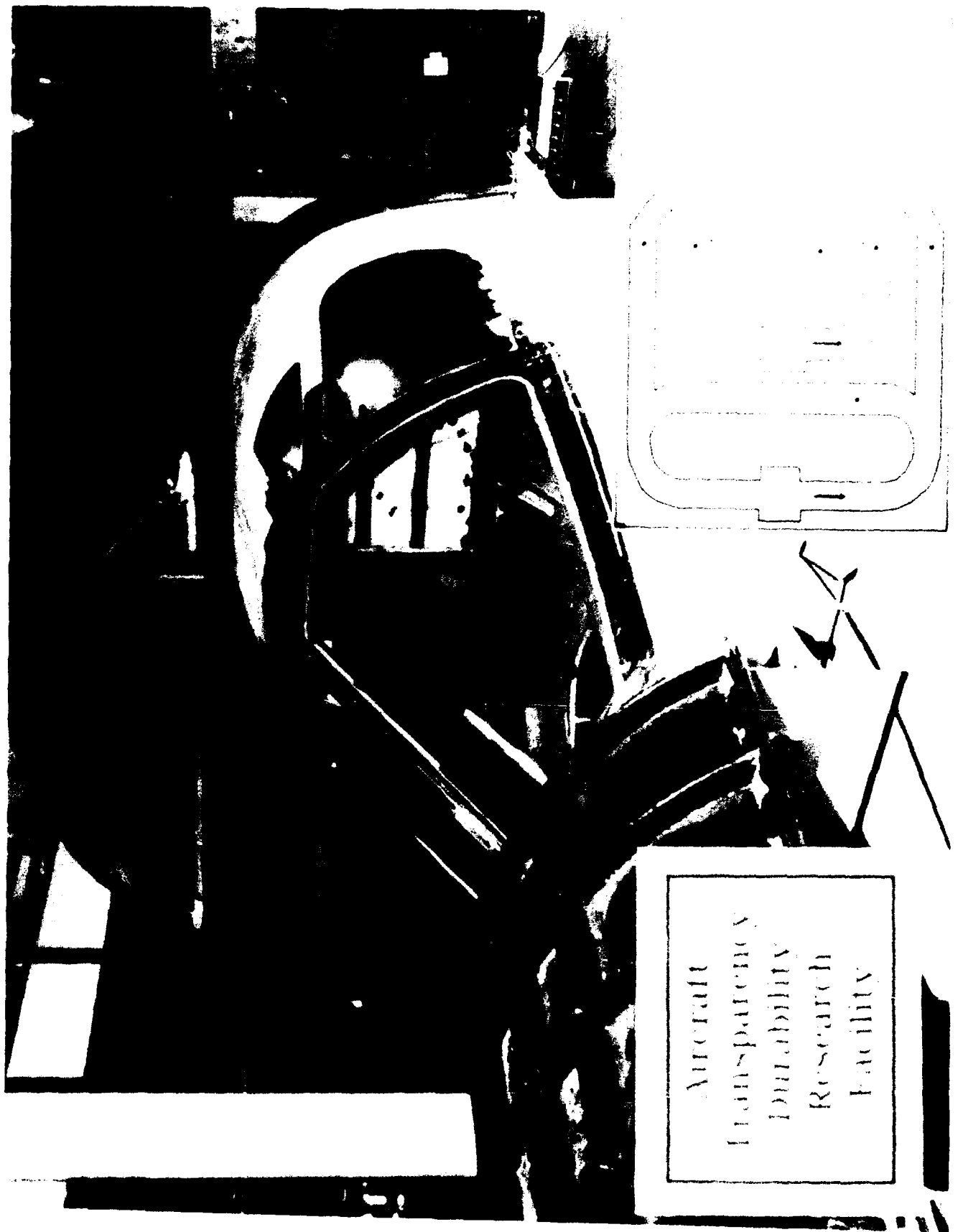
Limited US Government agency and industrial use

LOCATION:

BUILDING: 68 ROOM:

POINT OF CONTACT:

WL/FIVR
WPAFB, OH 45433-6553
(513) 255-4640
DSN 785-4640



FACILITY TYPE:

Center of Gravity and Inertia Meter (CGIM)

PURPOSE:

Locate the center-of-gravity (CG) and measure the moments and products of inertia of a test object

FACILITY NAME:

Center of Gravity Inertia Meter

PRIMARY CAPABILITIES:

Measure CG location and measure the moments and products of inertia of any object weighing less than 600 pounds and a maximum test volume of 40x54x70 inches

SPECIAL/UNIQUE CAPABILITIES:

The CGIM was built to determine the properties of an ejection seat/man combination

INSTRUMENTATION:

HP-85A table top computer; HP Model 3497A Data Acquisition Unit; Z-100 computer; printer

AVAILABILITY:

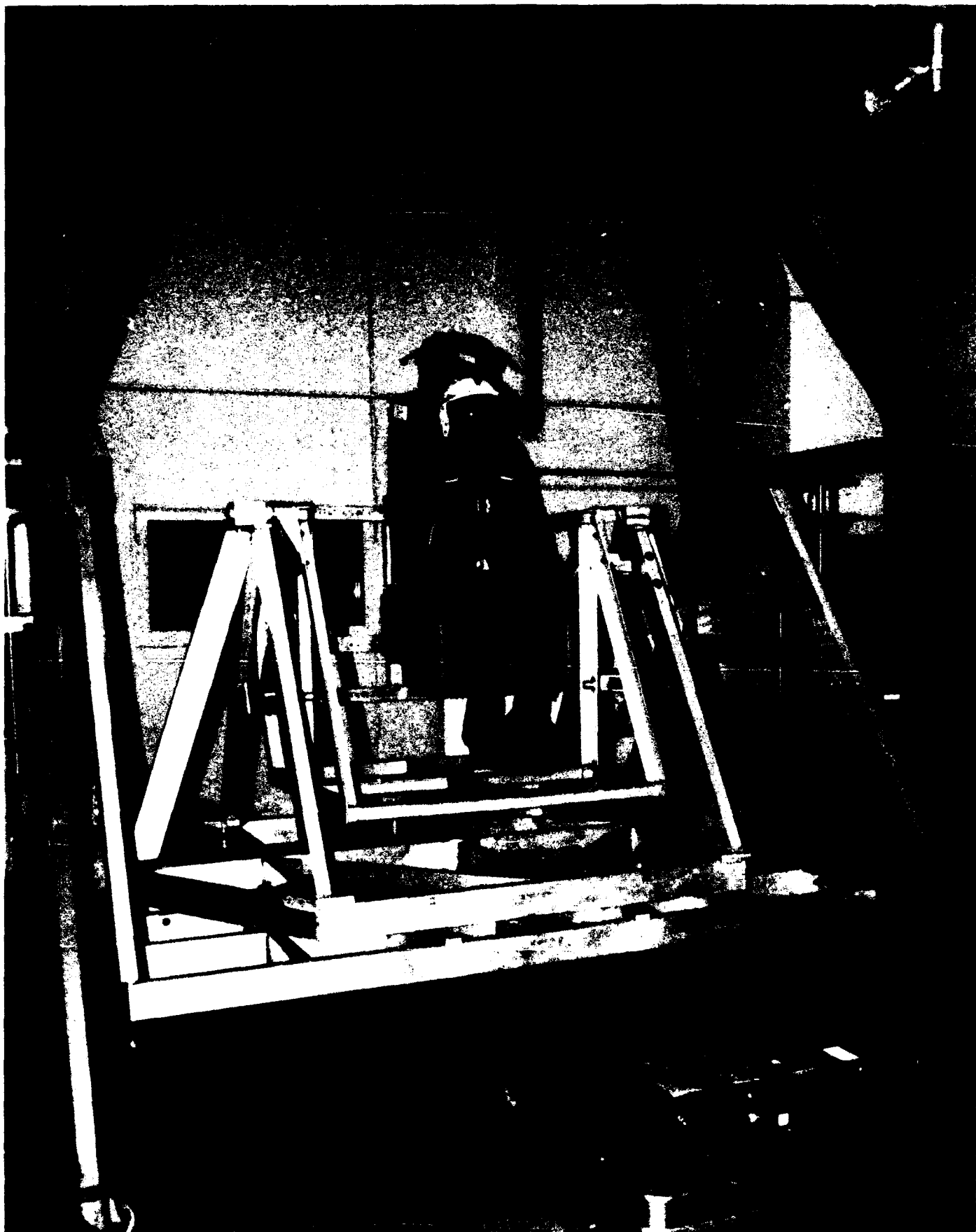
Primarily in-house research

LOCATION:

BUILDING: 255 ROOM: 103

POINT OF CONTACT:

WL/FIVR
WPAFB, OH 45433-6553
(513) 255-4008
DSN 785-3305



Center of Gravity Inertia Meter

FACILITY TYPE:

Water Table

PURPOSE:

Simulate high speed multi-body separation dynamics to provide flow visualization and aerodynamic data

FACILITY NAME:

Hydraulic Simulator

PRIMARY CAPABILITIES:

Flow visualization and surface topography for data acquisition

SPECIAL/UNIQUE CAPABILITIES:

Multi-body separation at simulated Mach number up to 12

INSTRUMENTATION:

Laser topographic system for surface mapping

Computer software for data reduction

AVAILABILITY:

Primarily in-house research

Available after December 1992

LOCATION:

BUILDING: 255 ROOM:

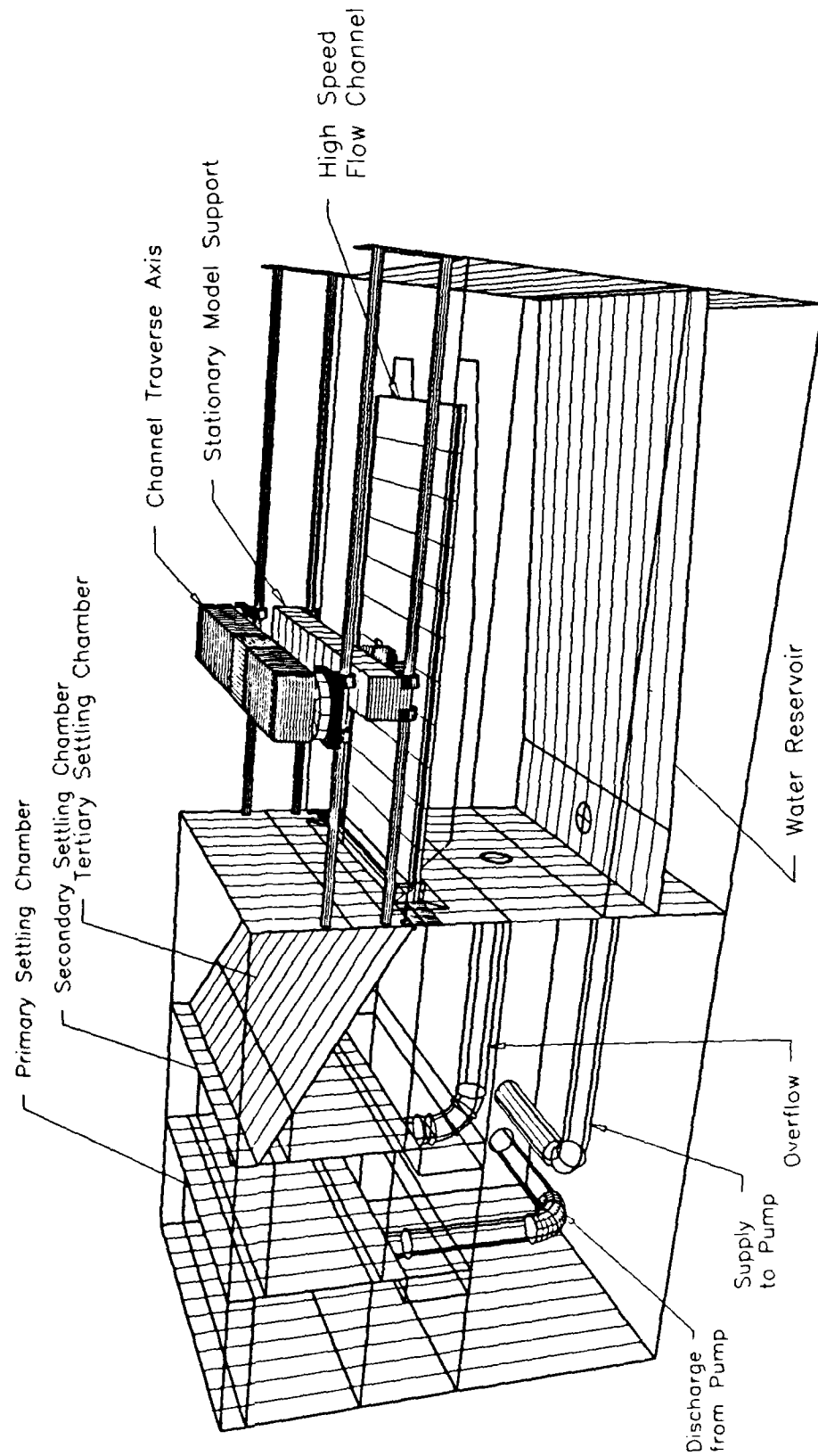
POINT OF CONTACT:

WL/FIVR

WPAFB, OH 45433-6553

(513) 255-4008

DSN 785-3305



Side Perspective View of the Hydraulic Simulator

FACILITY TYPE:

Computer Analysis

PURPOSE:

Conduct trajectory analyses of current and future escape/ejection systems and aircraft canopies; research impact of new technologies on escape/ejection systems

FACILITY NAME:

SUN GALAXY Workstation

PRIMARY CAPABILITIES:

Perform six degree of freedom analysis of crew systems and aircraft canopies

SPECIAL/UNIQUE CAPABILITIES:

Technology evaluation tool

INSTRUMENTATION:

None

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 255 ROOM: 103

POINT OF CONTACT:

WL/FIVR
WPAFB, OH 45433-6553
(513) 255-4008
DSN 785-3305



SUN GALAXY Workstation

FACILITY TYPE:

Research

PURPOSE:

To make available to designers a computer aided design technology to enable them to completely design & optimize the structure of aircraft transparency systems

FACILITY NAME:

Transparency Systems Computer Aided Design

PRIMARY CAPABILITIES:

Development and demonstration of integrated computer based analytical tools for evaluating structural, thermal, optical, ballistic, advanced threats, signature,

(cont) and durability aspects of transparency design concepts being considered for military missions in the 1995-2005 time frame

SPECIAL/UNIQUE CAPABILITIES:

Specialized computer analysis programs with animation capabilities

INSTRUMENTATION:

VAX workstation, IRIS workstation, Ethernet, TCP/IP protocol, scan converter, VCR, SONY RGB monitor, VAX 8650, CRAY XMP/216, CONVEX 220, fiber optics links

Location: Building 255, room 203; buildings 45 and 676

AVAILABILITY:

US Government agencies and their contractors

LOCATION:

BUILDING: ROOM:

POINT OF CONTACT:

WL/FIVR
WPAFB, OH 45433-6553
(513) 255-5060
DSN 785-5060

DEFLECTIONS IN Z DIRECTION

INCHES

.0565

.0500

.0436

.0371

.0306

.0242

.0177

.0112

.00475

-.00172

-.00819

-.0147

-.0211

-.0276

-.0341

-.0405

TRIM DATA SET, 4 FIXED NODES/FREE ARCH, FS 112/133/149/165
 PATTERN 2, 2 (OR LATER) DISP. FILE FOR INCR. FILE FOR INCR.
 FILE WRITTEN ON: 9-MAY-90 00:21:20 BY TAGPAT VERSION NO. = 1.04
 INPUT CURSOR CONTROL COMMANDS TO DEFINE THE SCENE OF THE FILE
 INPUT THE TITLE
 INCHES

END MAIL

HELP

11/2/81/13/3

FACILITY TYPE:

Aircraft Survivability/Vulnerability Research and Live Fire Testing

PURPOSE:

Support the research and development of combat survivable systems; Center of Expertise for Live Fire Testing

FACILITY NAME:

Aircraft Survivability Research Facility

PRIMARY CAPABILITIES:

Range 1 - Basic research and development; develop threat simulations and test range instrumentation; evaluate material and component ballistic tolerance

Range 2 - Research and testing involving fueled and non-fueled survivability vulnerability programs

Range 3 - Study ballistic survivability vulnerability on full-scale test programs; large scale research programs for technology development

SPECIAL/UNIQUE CAPABILITIES:

Range 1 - 10 ft x 12 ft x 65 ft (max standoff) indoor range

Range 2 - 26 ft X 24 ft x 27 ft x 100 yards long horizontal outdoor range

Range 3 - 40 ft w x 25 ft d x 39 ft h vertical range; 40 ft w x 25 ft d x 50 ft l horizontal range; airflow up to 550 knots

INSTRUMENTATION:

Range 1 - Manual or fully automated solid state electronics with computer sequencing

Ranges 2 and 3 - Manual or fully automated with computer sequencing; high speed multichannel data collection; visual cinematographic coverage up to 10,000 frps;

(cont) high speed video

AVAILABILITY:

Available to all U.S. Government agencies

Limited availability to industry

LOCATION:

BUILDING: 94 ROOM: UpEncl

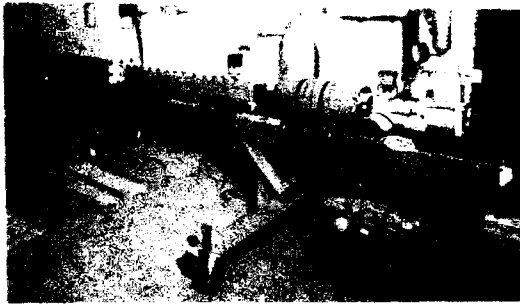
POINT OF CONTACT:

WL/FIVS

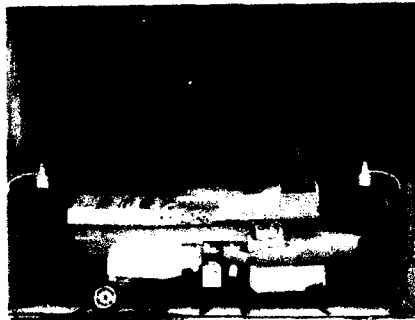
WPAFB, OH 45433-6553

(513) 255-6302

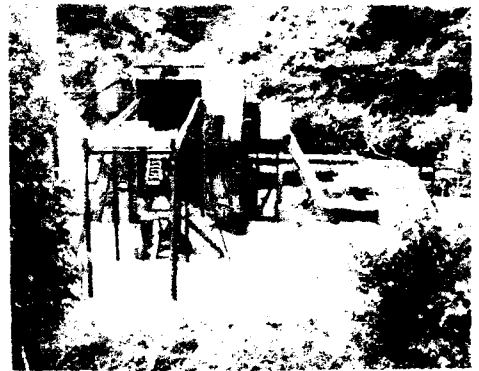
DSN 785-6302



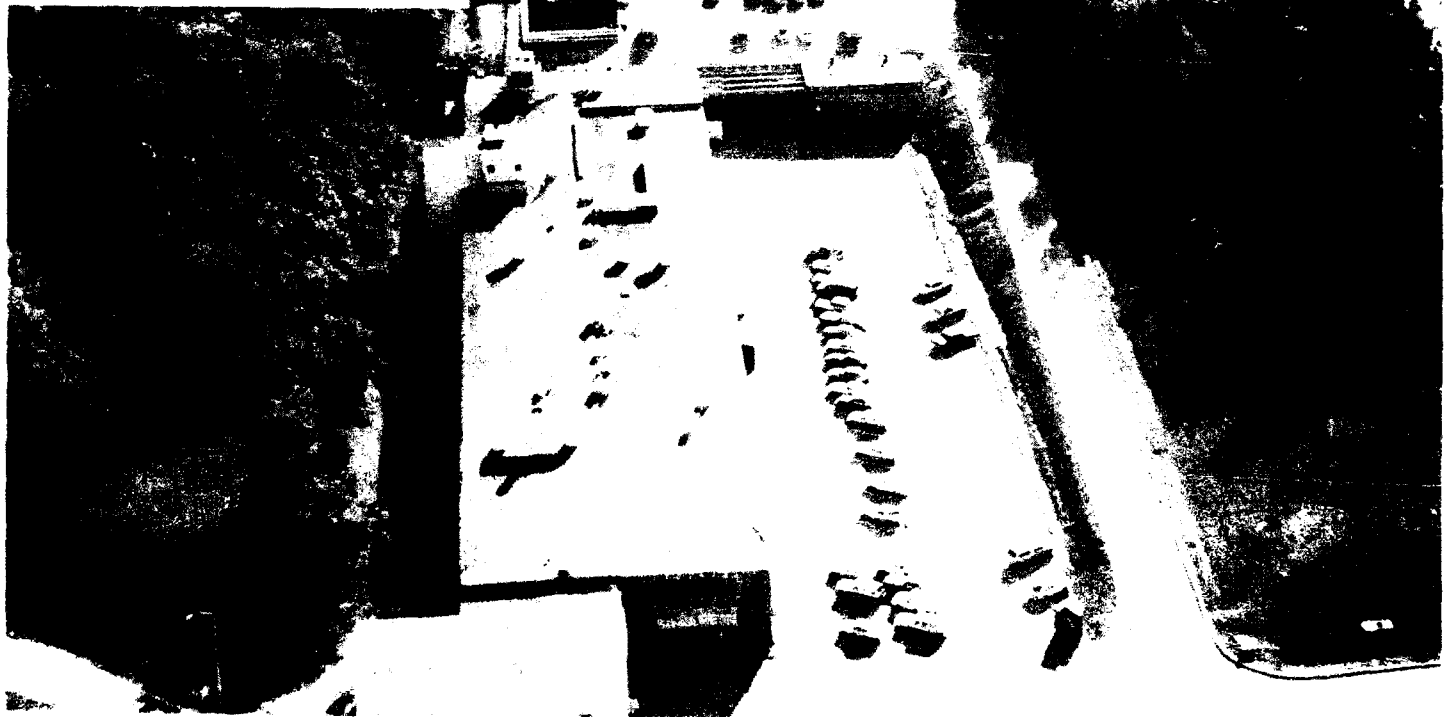
Range 1



Range 2



Range 3



AIRCRAFT SURVIVABILITY RESEARCH FACILITY



FACILITY TYPE:

Advanced Composite Materials

PURPOSE:

Conduct mechanical property tests on advanced composite materials

FACILITY NAME:

Mechanics of Composites Test Laboratory

PRIMARY CAPABILITIES:

Static and dynamic testing of composite material, coupons

Environmental testing of coupons (temperature, moisture)

Generation of strength, and modulus data

SPECIAL/UNIQUE CAPABILITIES:

600 degF elevated temperature

-100 degF low temperature chamber

Combined tension-torsion testing; load or displacement controlled testing

INSTRUMENTATION:

Foil type strain gauges; extensometers

Thermocouples; acoustic emission

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 654 ROOM: 234

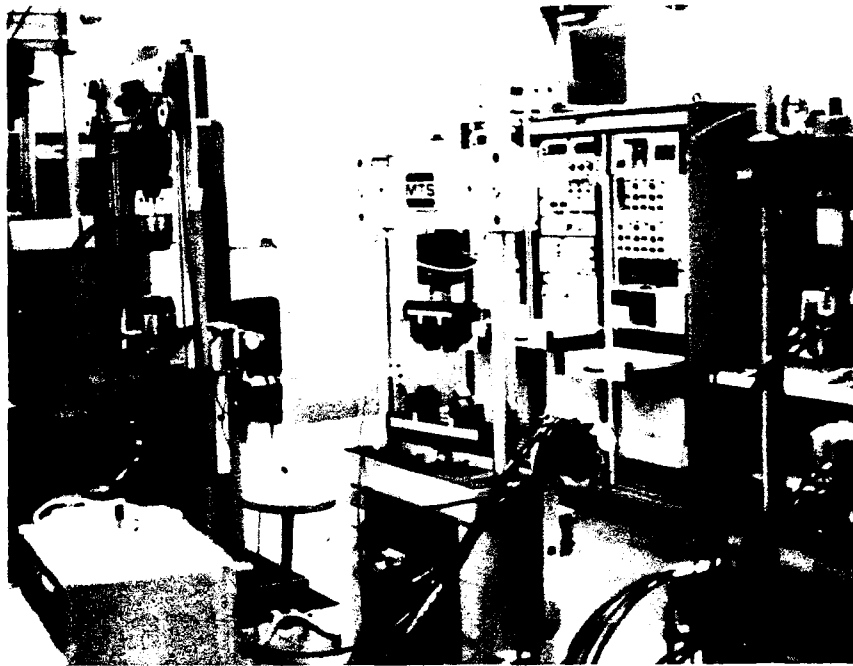
POINT OF CONTACT:

WL/MLBM

WPAFB, OH 45433-6533

(513) 255-7131

DSN 785-7131



Mechanics of Composites Test Lab

FACILITY TYPE:

Epitaxial Film Growth

PURPOSE:

Research epitaxial film growth

FACILITY NAME:

Molecular Beam Epitaxy and Surface Analysis Instrument

PRIMARY CAPABILITIES:

Epitaxial film growth of III-V semiconductor materials

Surface analytic instrumentation

SPECIAL/UNIQUE CAPABILITIES:

In-site film growth and surface analysis capability

Fully computer controlled

INSTRUMENTATION:

Eight Knudsen cells

Scanning auger microscope

X-ray photoexcitation spectroscopy; ion scattering
spectrometry

AVAILABILITY:

Primarily in-house research

Limited U.S. Government agency use

LOCATION:

BUILDING: 652 ROOM: 136

POINT OF CONTACT:

WL/MLBM

WPAFB, OH 45433-6533

(513) 255-5892

DSN 785-5892

Molecular Beam Epitaxy and Surface Analysis Instrument



FACILITY TYPE:

Elastomer Characterization

PURPOSE:

Formulate and evaluate elastomeric materials (seals and sealants) for Air Force applications

FACILITY NAME:

Elastomers Facility

PRIMARY CAPABILITIES:

Elastomer compounding in various sizes (micro, 3x5, 8x12, 8x15 rubber mills)

Elastomer curing and post curing (two 50 ton and one 10 ton presses; four ovens with 600 degF capability)

Fluid aging of elastomers (low temperature and explosion proof ovens)

Dynamic testing of O-ring and special design seals (8000 psi, 350 degF capability)

SPECIAL/UNIQUE CAPABILITIES:

Only facility currently capable of testing candidate seals for chlorotrifluoroethylene hydraulic fluid at 350 degF

Measurement of drag force and correlation with seal designs

Wide frequency range of dynamic seal testing (20 Hz to .01 Hz; .01 to 2.50 inch stroke; both rod and piston seal test cells available)

INSTRUMENTATION:

Instron Model 1102 and 4201, 1100 and 5000 lb Tensile Testers, computer automated

Two MTS Model 810 test cells for seal testing

AVAILABILITY:

Available to U.S. Government agencies

Limited industrial use

LOCATION:

BUILDING: 654 ROOM: 3,103

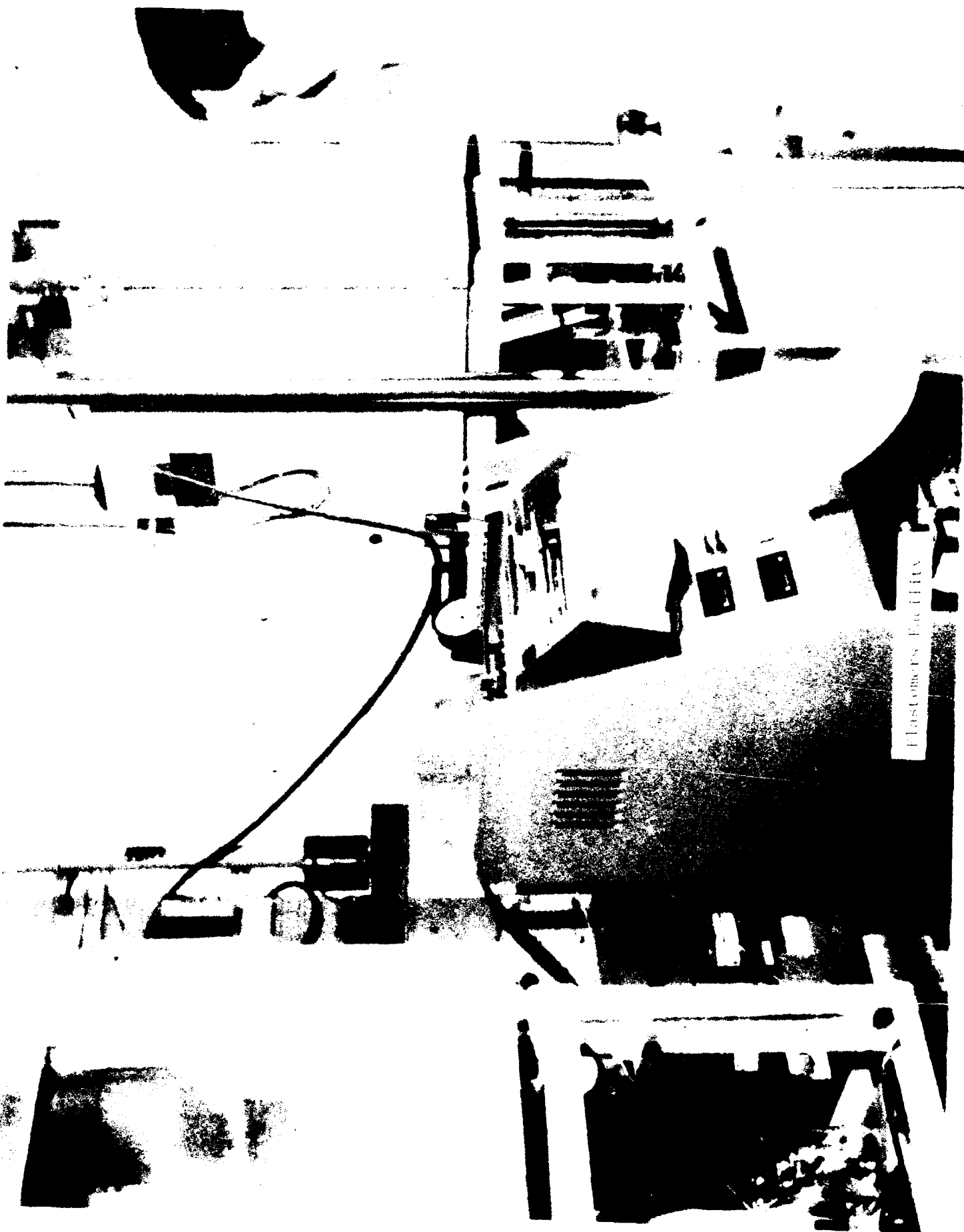
POINT OF CONTACT:

WL/MLBT

WPAFB, OH 45433-6533

(513) 255-9016

DSN 785-9016



FACILITY TYPE:

Fluid and Lubricant Research

PURPOSE:

Provide advanced fluid and lubricant materials technology for advanced systems

FACILITY NAME:

Fluid and Lubricant Development, Characterization, and Validation Facility

PRIMARY CAPABILITIES:

Synthesis and characterization of advanced lubricants and additives

Computational chemistry and tribological modeling

Prototype fluid formulation and assessment

Validation of candidate fluids and lubricants over anticipated temperature ranges in mechanical components, e.g., hydraulic pumps, bearing rigs, etc.

SPECIAL/UNIQUE CAPABILITIES:**INSTRUMENTATION:**

Materials analysis and characterization facility; -65 degF., to 800 degF rheological property test facility; 600 degF., 8000 psi hydraulic pump test stand

High temperature bearing test rigs; wide temperature range (-40 degF. to 400 degF.) bearing test rigs

Small scale traction test rig for advanced lubricants; thermal/oxidative stability (to 800 degF.) characterization facility

AVAILABILITY:

Available to U.S. Government agencies

LOCATION:

BUILDING: 654 ROOM: 1st F1

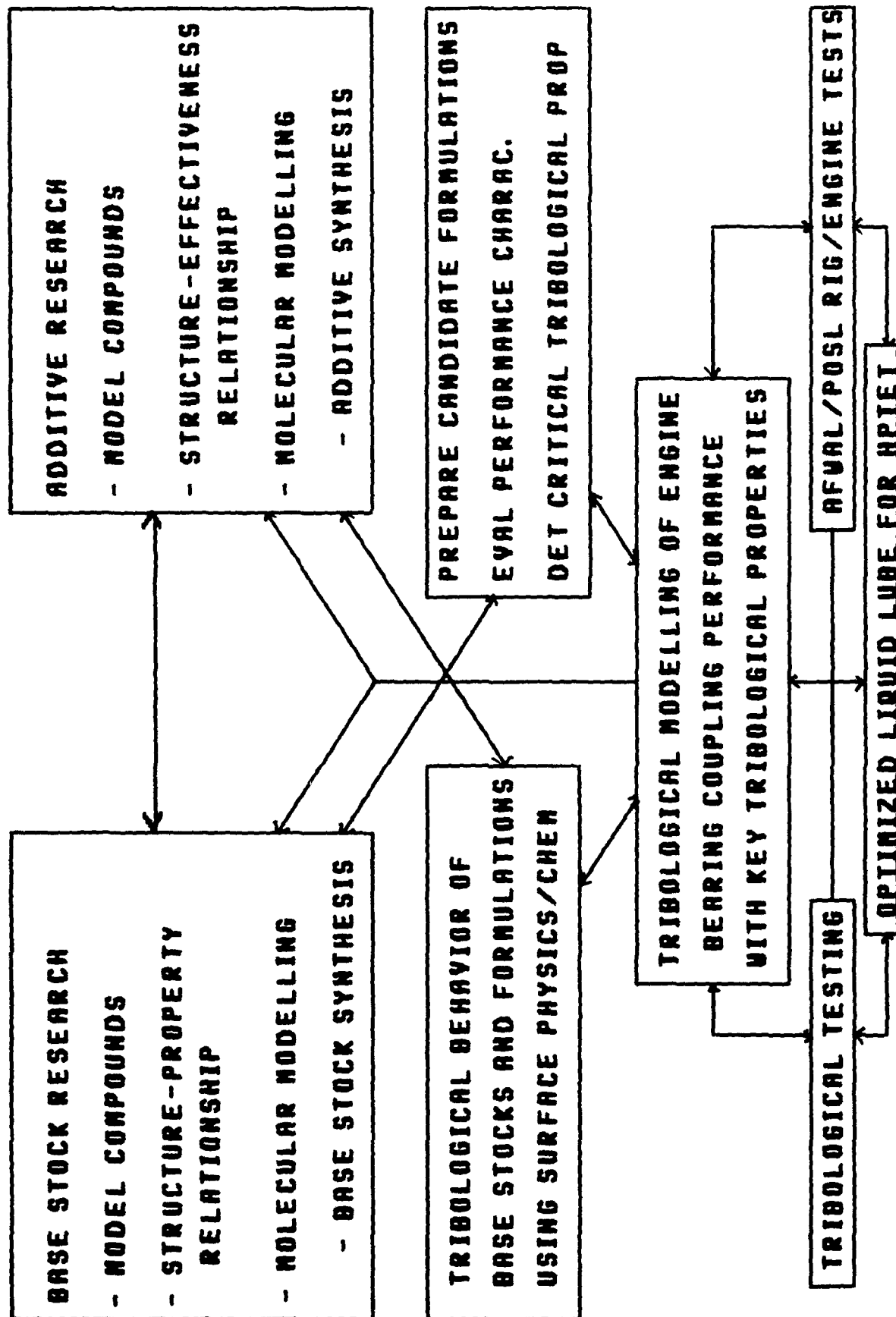
POINT OF CONTACT:

WL/MLBT

WPAFB, OH 45433-6533

(513) 255-9036

DSN 785-9036



Fluid and Lubricant Development, Characterization, and Validation Facility

FACILITY TYPE:

Space Combined Environment

PURPOSE:

Determine effects of space environment on radiative (optical) properties of exterior spacecraft thermal control materials

FACILITY NAME:

Space Combined Effects Primary Test Research Equipment (SCEPTRE)

PRIMARY CAPABILITIES:

Test and evaluate exploratory coatings and thermal control materials in a simulated space environment

Provide environment including high vacuum (5×10^{-8} Torr), ultraviolet radiation (0.1 to 3.0 EUVS),

and simultaneous electron irradiation (max Flux: 10×10^{12} e/cm²/sec from 0.1 to 20.0 KeVs)

SPECIAL/UNIQUE CAPABILITIES:

Simultaneous electron/UV irradiation

Fiber optically coupled in-situ measurement of reflectivity

INSTRUMENTATION:

Spectrophotometer; spectroradiometer

Solar simulator; computer control/acquisition

Two mass spectrometers; programmable electrometer/source; two electron guns; pressure and temperature gauges

AVAILABILITY:

Primarily in-house research

Available to US Government agencies

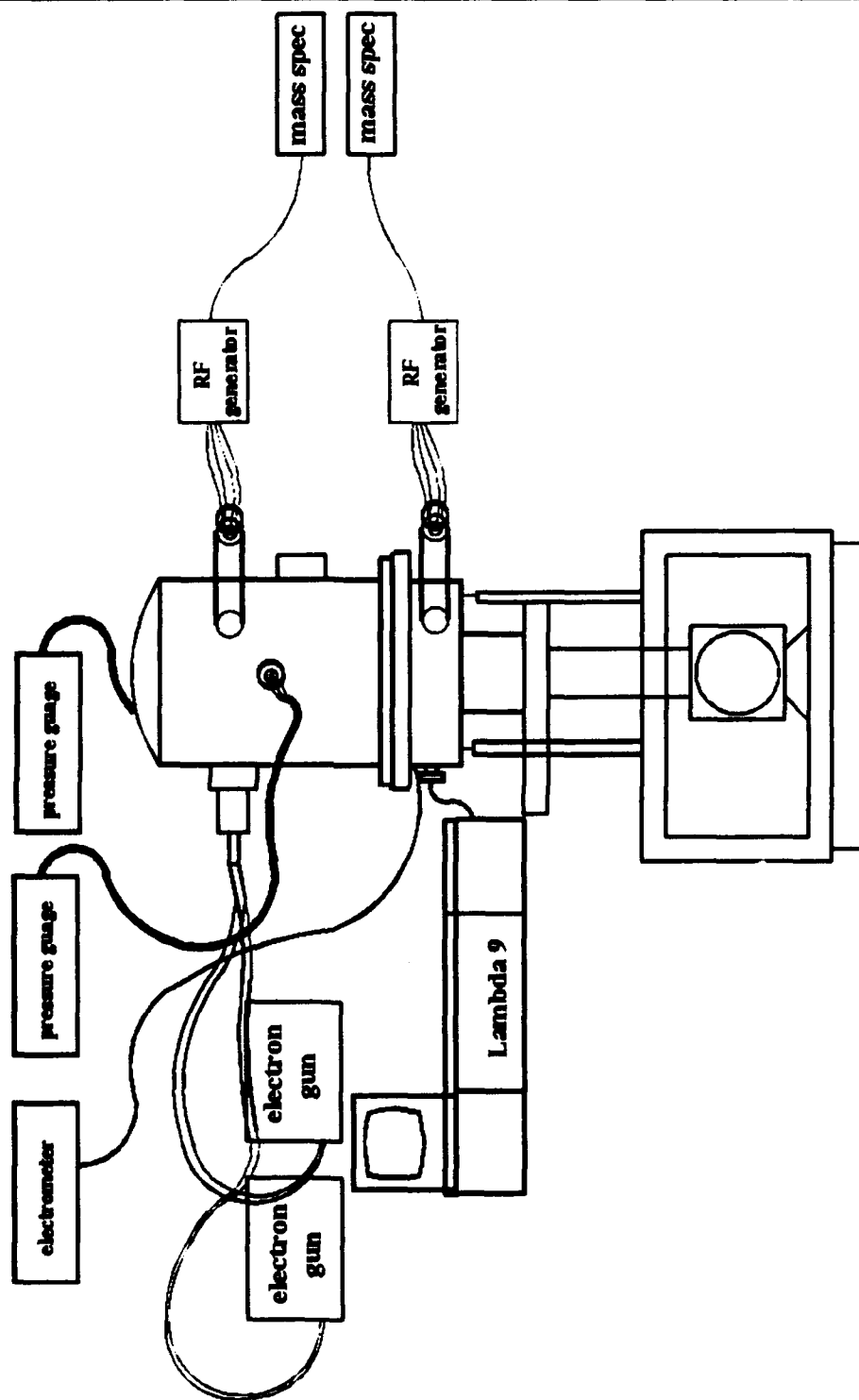
LOCATION:

BUILDING: 654 ROOM: 104

POINT OF CONTACT:

WL/MLBT
WPAFB, OH 45433-6533
(513) 255-9022
DSN 785-9022

SCEPTRE Facility



FACILITY TYPE:

Ceramic and composite research

PURPOSE:

Develop understanding of ceramic composites for high temperature structural applications

FACILITY NAME:

Ceramic Composite Research Laboratory

PRIMARY CAPABILITIES:

Chemical synthesis of ceramic precursors

Fiber/matrix interface control

Composite fabrication

Specialized composite testing

SPECIAL/UNIQUE CAPABILITIES:

Interface property testing

Sol-Gel and Chemical Vapor Deposition (CVD) fiber coating

INSTRUMENTATION:

2000 degC air furnace

2500 degC vacuum hot press

Fiber push-out test stand

AVAILABILITY:

Primarily in-house

Limited availability to government agencies, industry and contractors

LOCATION:

BUILDING: 655 ROOM: Many

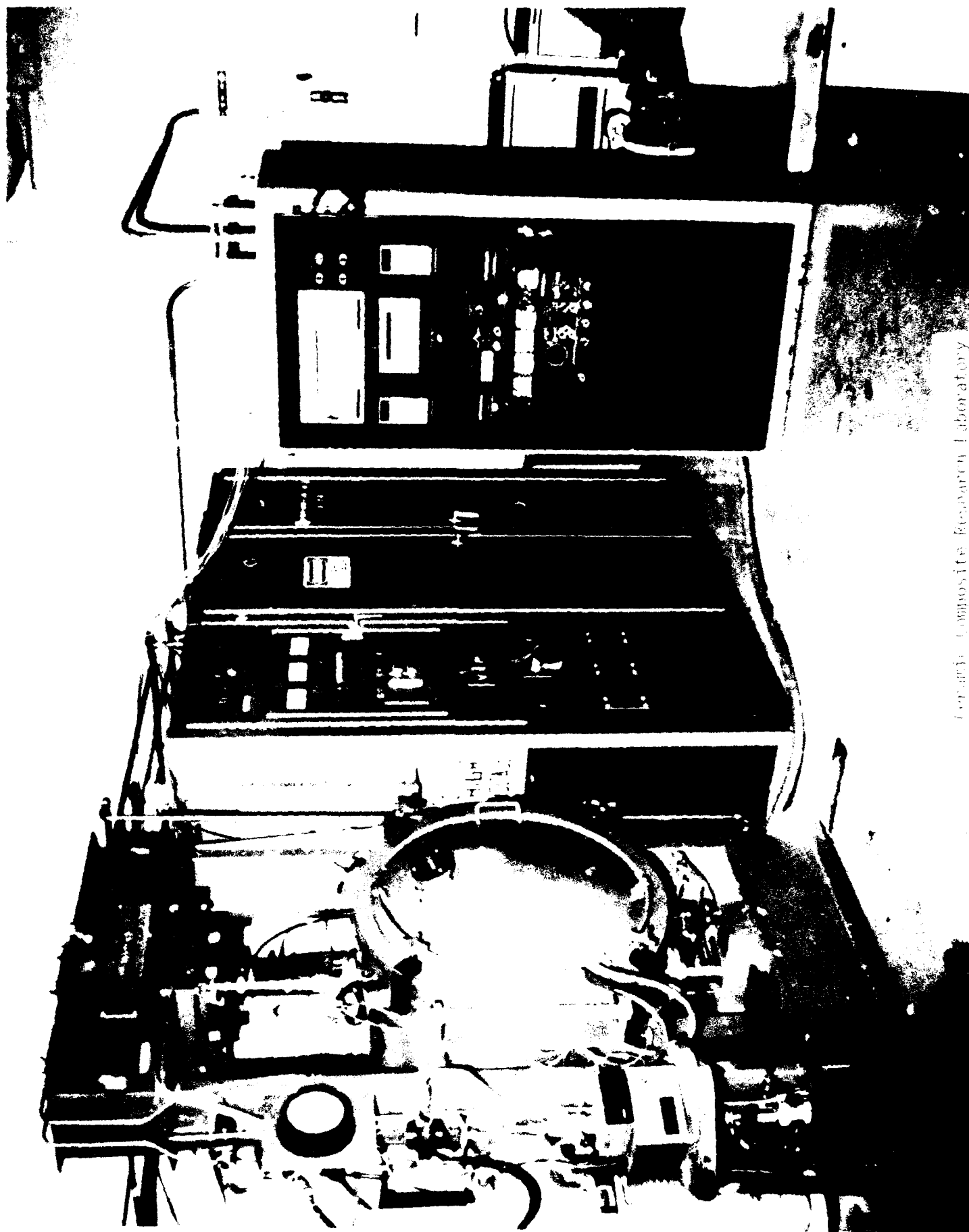
POINT OF CONTACT:

WL/MLLM

WPAFB, OH 45433-6533

(513) 255-9823

DSN 785-9823



Ceramic Composite Research Laboratory

FACILITY TYPE:

Materials Processing

PURPOSE:

Develop improved aerospace materials processing

FACILITY NAME:

Experimental Materials Processing Laboratory

PRIMARY CAPABILITIES:

Extrusion, forging, rolling, and swaging

Heat treatment

SPECIAL/UNIQUE CAPABILITIES:

Computer-aided process modeling; CAD/CAM; data acquisition

Link to 4950th Test Wing

Only pilot scale equipment in the U.S. dedicated to research

INSTRUMENTATION:

CAD/CAM terminal; process modeling software

700 ton extrusion and forge press

Vacuum arc melters

AVAILABILITY:

Available to U.S. Government agencies and contractors

Limited industrial use

LOCATION:

BUILDING: 655 ROOM: Hi Bay

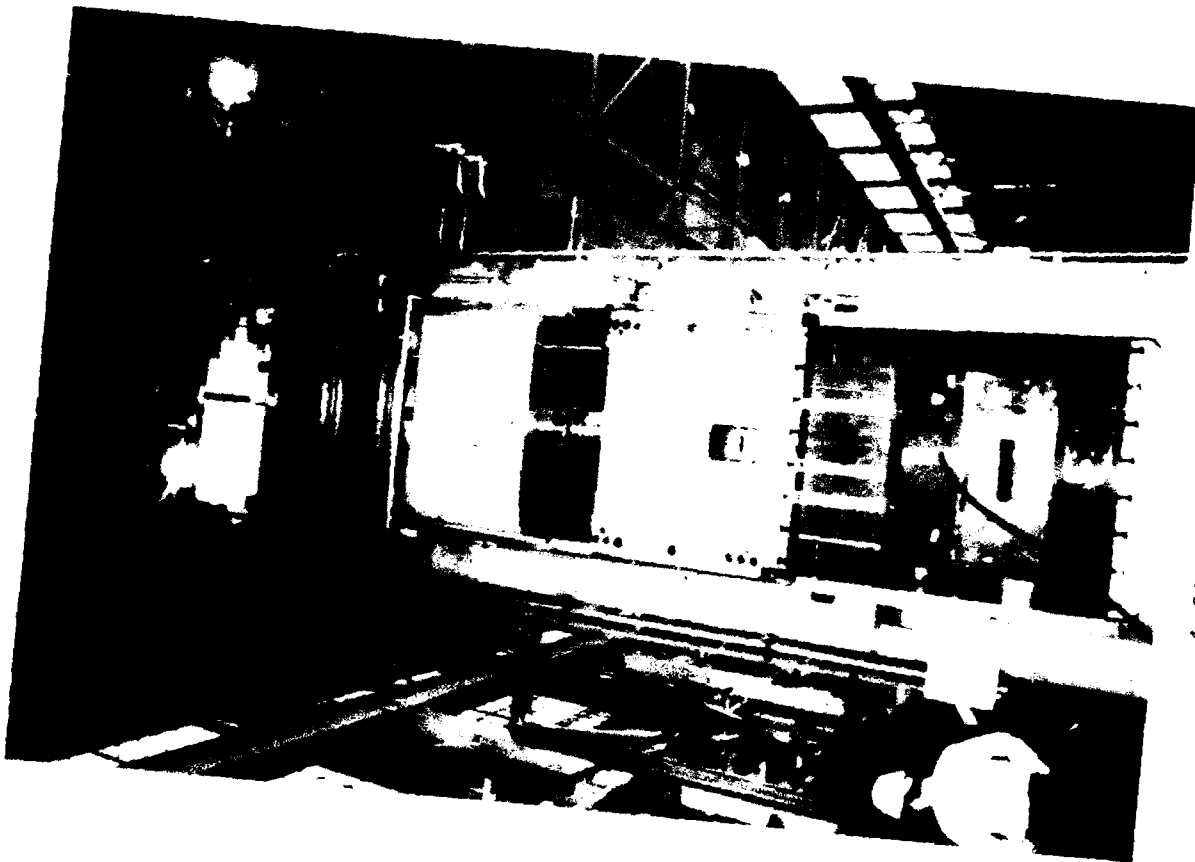
POINT OF CONTACT:

WL/MLLM

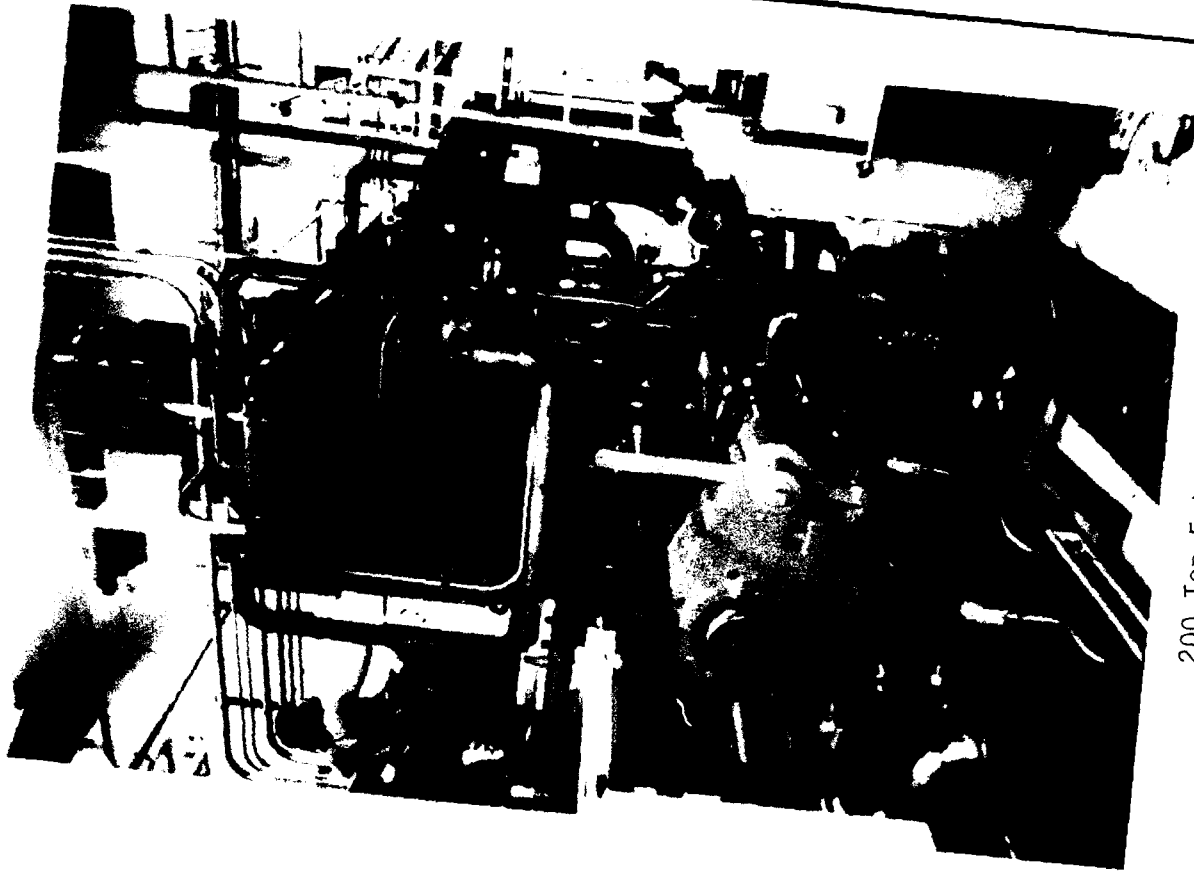
WPAFB, OH 45433-6533

(513) 255-9835

DSN 785-9835



1,000 Ton Forge Press



200 Ton Extrusion Press

Experimental Materials Processing Laboratory

FACILITY TYPE:

High temperature materials synthesis and testing

PURPOSE:

Understand and develop new high temperature metallic and intermetallic materials for aerospace systems

FACILITY NAME:

High Temperature Materials Laboratory

PRIMARY CAPABILITIES:

Materials synthesis, high temperature heat treating, high temperature mechanical characterization, and high temperature structural characterization

SPECIAL/UNIQUE CAPABILITIES:

High temperature mechanical testing (tension, compression, bending and creep) in inert environments to temperatures as great as 1500 deg C

Solidification processing (including directional solidification and crystal growth) of reactive metals from ceramicless levitated melt.

X-ray diffraction at high temperature (to 1500 deg C); Heat treating in air or inert environments to temperatures in excess of 2000 deg C;

INSTRUMENTATION:

Crystallox MCGS-5 multipurpose solidification processing system; Laboratory located in rooms 124, 130, 140, 188, 199

Rigaku automated, rotating anode source, high temperature X-Ray diffractometer

Mechanical testing frames outfitted with controlled environmental chambers, furnaces, and tooling for tensile, creep, bending, and compression testing at 1500C

AVAILABILITY:

Primarily in-house research; Available to U.S. government agencies, contractors

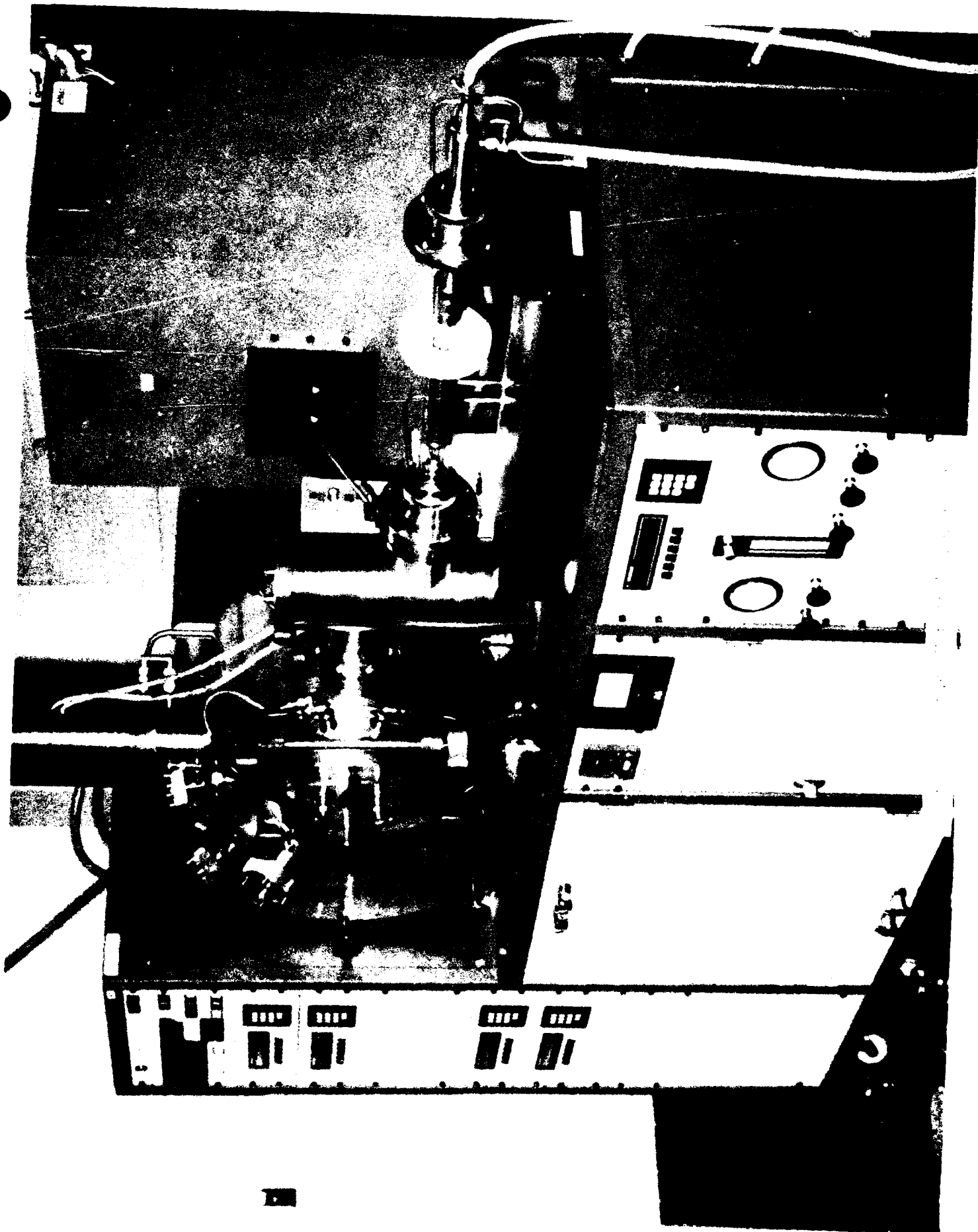
Also universities on space available/noninterference basis

LOCATION:

BUILDING: 655 ROOM: Many

POINT OF CONTACT:

WL/MLLM
WPAFB, OH 45433-6523
(513) 255-9821
DSN 785-9821



FACILITY TYPE:

Metallography

PURPOSE:

Perform optical microscopic characterization of materials and develop new specimen preparation and examination techniques

FACILITY NAME:

Materials Characterization Facility (Metallography Laboratory)

PRIMARY CAPABILITIES:

Optical microscopy quantitative characterization, and metallographic specimen preparation on metallics, nonmetallics, metal and ceramic composites

SPECIAL/UNIQUE CAPABILITIES:

Quantitative Metallography; Interference Microscopy

Nomarski Imaging; Roper Analytical Research Electropolishing (RARE) System

High Energy Rapid Electropolishing (HERE) System

INSTRUMENTATION:

Light optical microscopes; Research metallographs

Image analysis system; Microhardness testers; Electropolishers

AVAILABILITY:

Primarily in-house research

Available to U.S. government agencies

LOCATION:

BUILDING: 655 ROOM: 097

POINT OF CONTACT:

WL/MLLM

WPAFB, OH 45433-6533

(513) 255-1314

DSN 785-1314

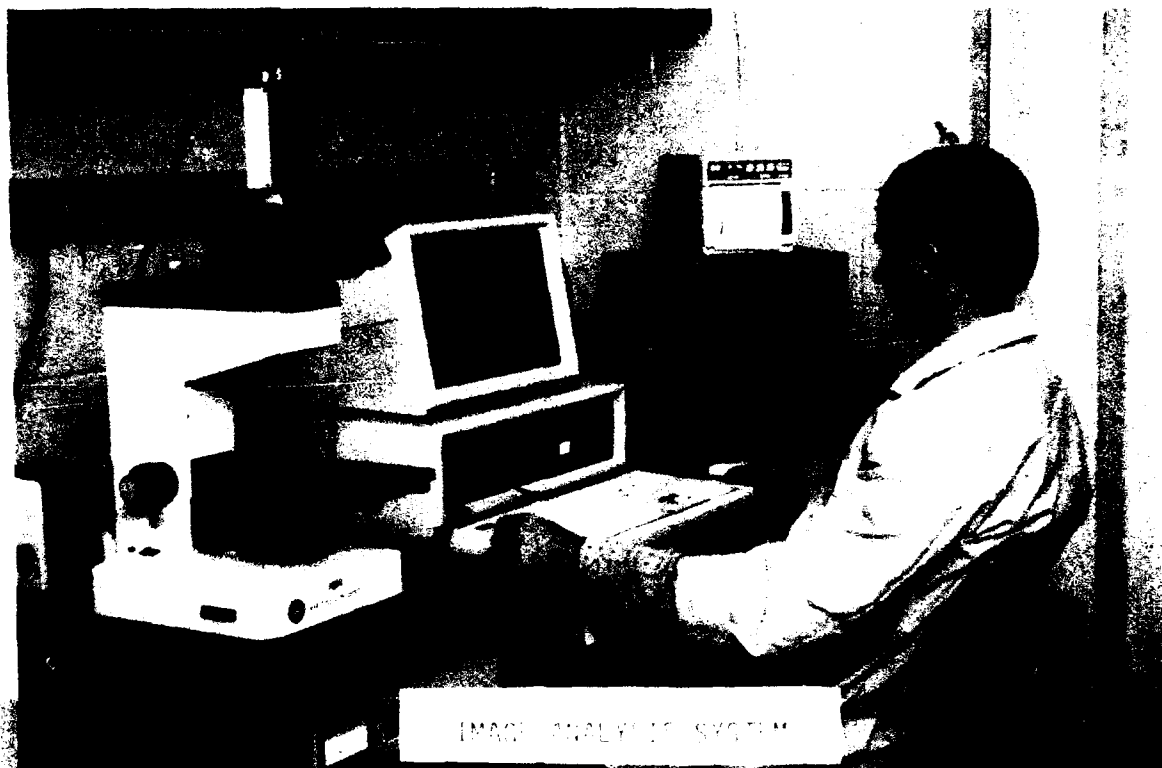


IMAGE ANALYSIS SYSTEM



SEM/EDS ANALYSIS

Materials Characterization Facility
(Metallography Laboratory)

FACILITY TYPE:

Metallurgy

PURPOSE:

Increase basic knowledge of metallurgical processing for controlling the microstructure and mechanical properties of metallic aerospace alloys and composites

FACILITY NAME:

Metallurgical Research Laboratory

PRIMARY CAPABILITIES:

Heat treatment of metals in air and vacuum

Vacuum hot pressing including uniaxial and isostatic pressure

Advanced processing, novel metallic alloys and composites

SPECIAL/UNIQUE CAPABILITIES:

Heat treatment including annealing, quenching and aging of advanced titanium alloys for improved high temperature performance

Material processing including rapid solidification technology (RST) and metal matrix composites (MMC)

Hot consolidation of advanced powder metallurgy (P/M) RST alloys and advanced titanium MMC material

INSTRUMENTATION:

Vacuum heat treating

Hot isostatic pressing

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 655 ROOM: 47,49

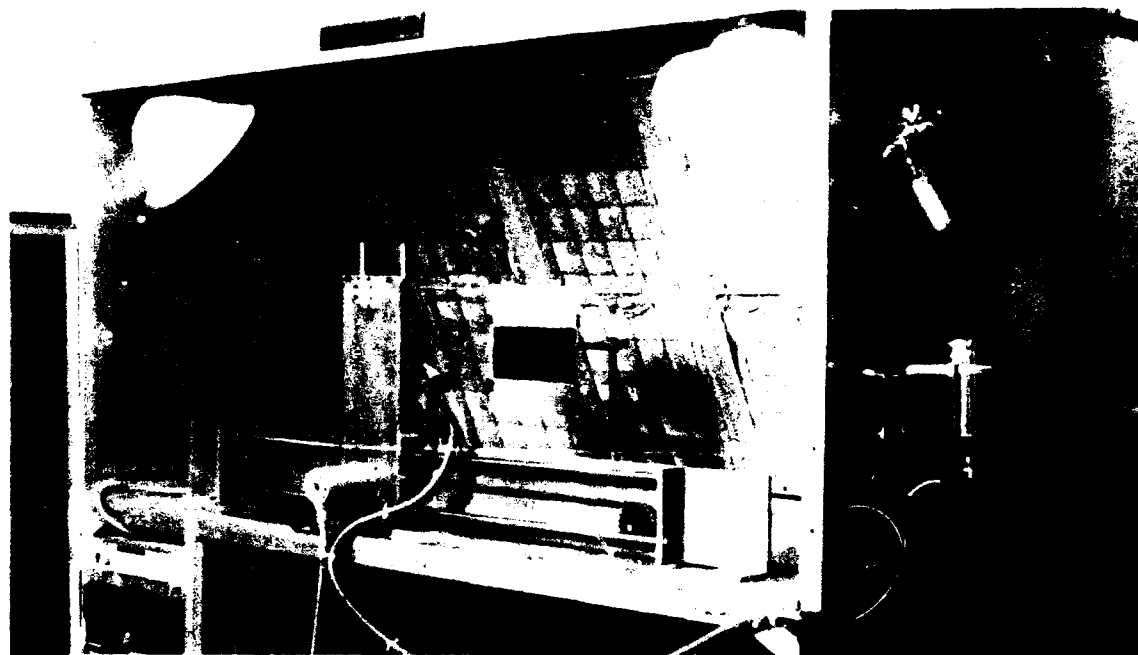
POINT OF CONTACT:

WL/MLLM

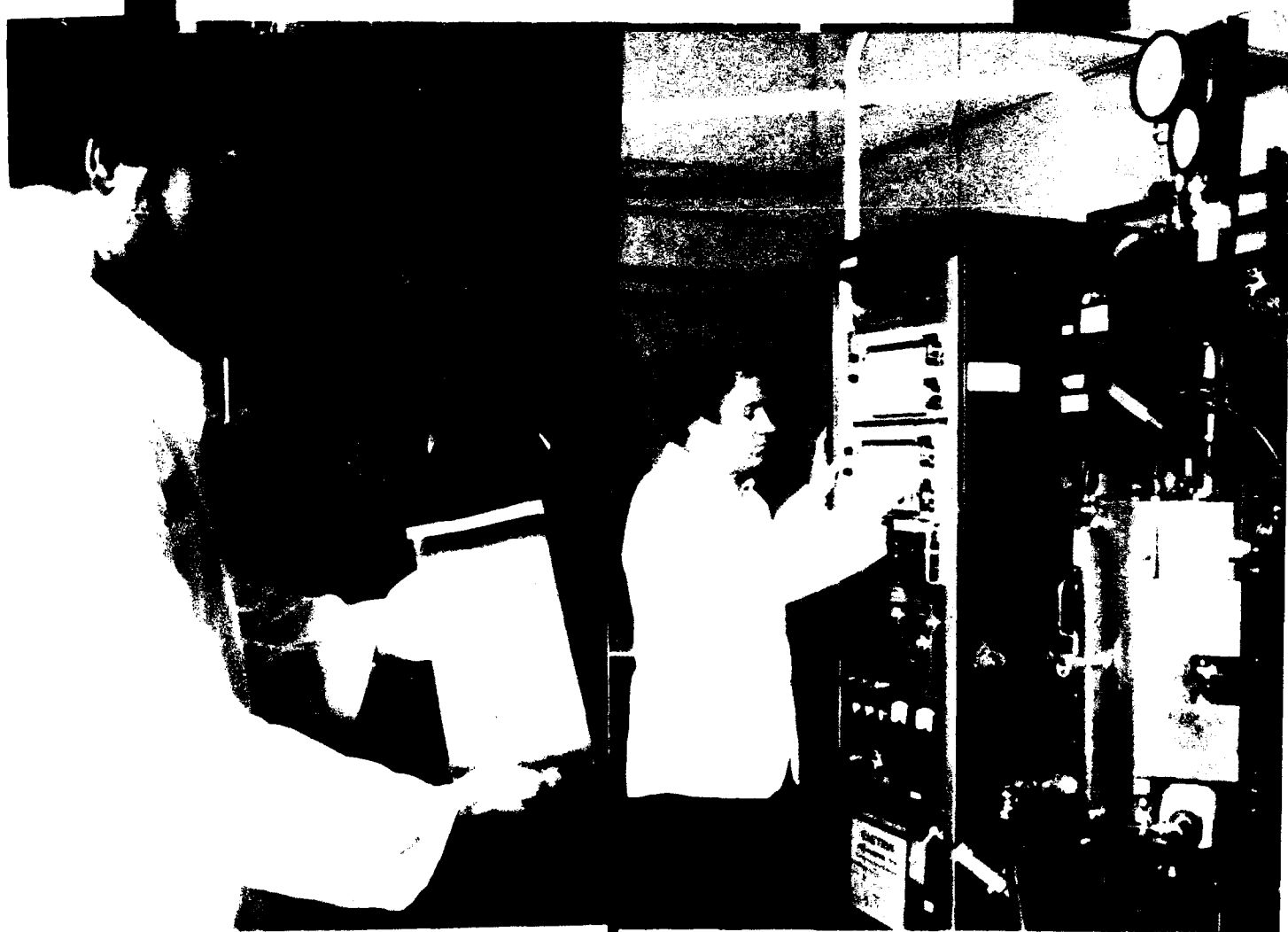
WPAFB, OH 45433-6533

(513) 255-1313

DSN 785-1313



METAL MATRIX COMPOSITE LAB



TITANIUM COMPOSITE PLY

VACUUM HOT PRESS

FACILITY TYPE:

Mechanical Testing

PURPOSE:

Evaluate mechanical properties of materials under typical loading conditions for advanced aerospace applications

FACILITY NAME:

Materials Behavior Research Laboratory

PRIMARY CAPABILITIES:

Computer controlled fatigue and fatigue crack growth testing at elevated temperature

High frequency and low cycle fatigue of metals and composites

Creep, fatigue, and thermal-mechanical fatigue of high temperature metallic and ceramic composite materials

SPECIAL/UNIQUE CAPABILITIES:

Fully automated fatigue crack growth capability using extensometers, electric potential, and laser interferometer methods for crack length/closure determination

High-temperature, computer controlled thermo-mechanical fatigue of high temperature composites; High vacuum (10^{-10} torr) capability

Unique data acquisition and data processing programs

INSTRUMENTATION:

State-of-the-art elevated temperature fatigue instrumentation, temperature control and measurement, and laser and optical displacement measurement systems

AVAILABILITY:

Exclusively for in-house research

LOCATION:

BUILDING: 655 ROOM: Many

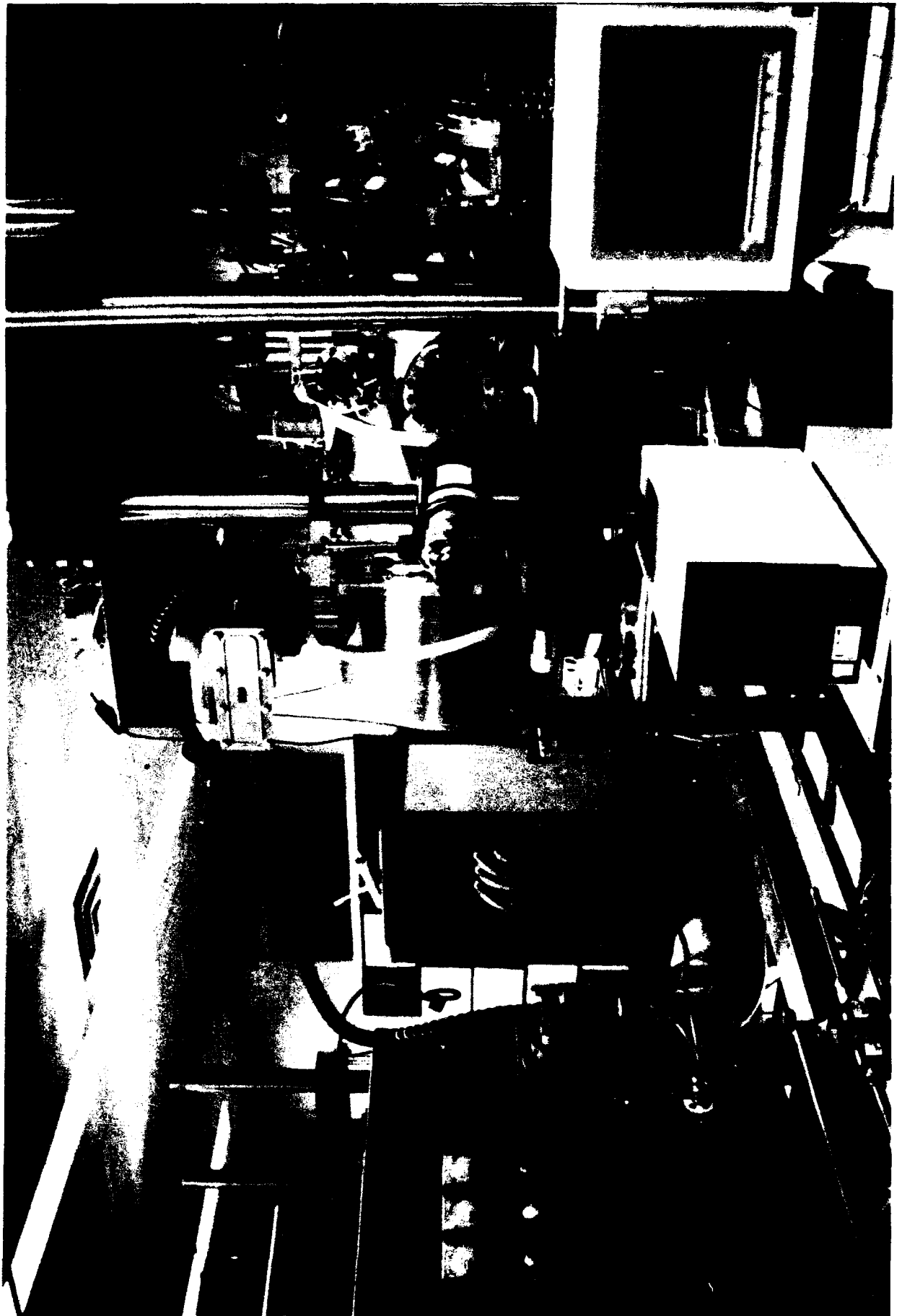
POINT OF CONTACT:

WL/MLLN

WPAFB, OH 45433-6563

(513) 255-1347

DSN 785-1347



Materials Behavior Testing Laboratory

FACILITY TYPE:

Non-Destructive Evaluation (NDE) research

PURPOSE:

Investigate and develop novel NDE methods and their supportive functions to meet critical needs of advanced materials, processes and structures

FACILITY NAME:

Materials Laboratory NDE In-House Research Facility

PRIMARY CAPABILITIES:

Specialization in the area of ultrasonic and thermal wave NDE development

Signal and image processing methodology for discrete imaging of defects in advanced materials and structures, and anomaly analysis

SPECIAL/UNIQUE CAPABILITIES:

Automated ultrasonic scanning equipment with macro and micro scale resolution down to 0.001 inch capability

Digitization capabilities for discrete signal acquisition and analysis

Thermal wave imaging of micro scale defects in small specimens

INSTRUMENTATION:

Large area ultrasonic system

Small specimen ultrasonic system

Thermal wave imaging system

AVAILABILITY:

Primary in-house research; universities and industry on non-interference basis

Available to U.S. government agencies

LOCATION:

BUILDING: 655 ROOM: Many

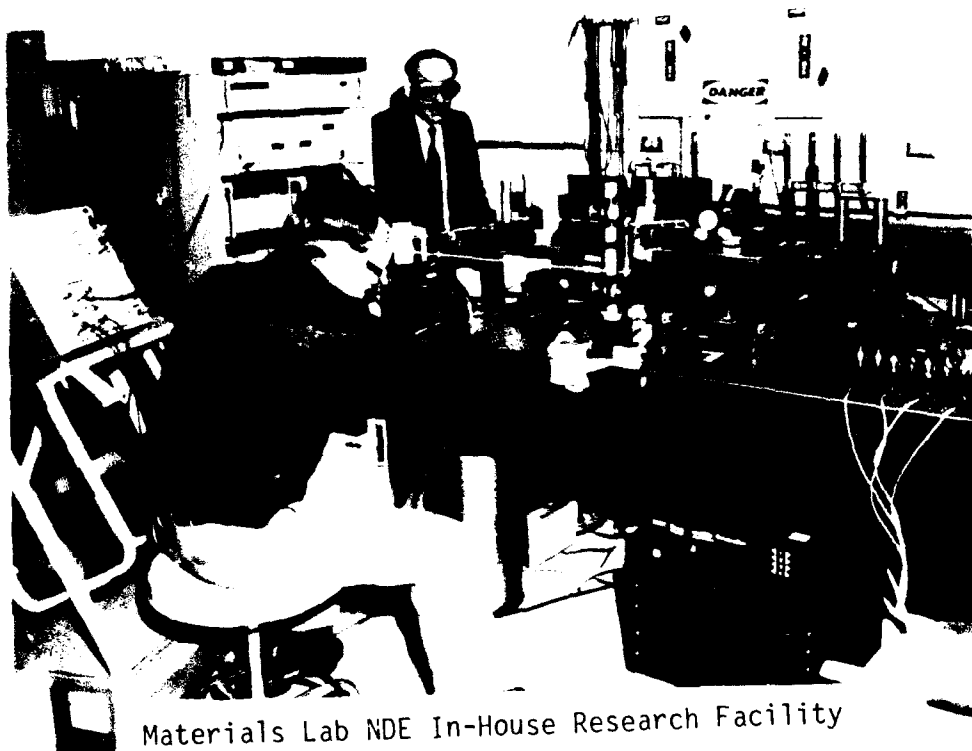
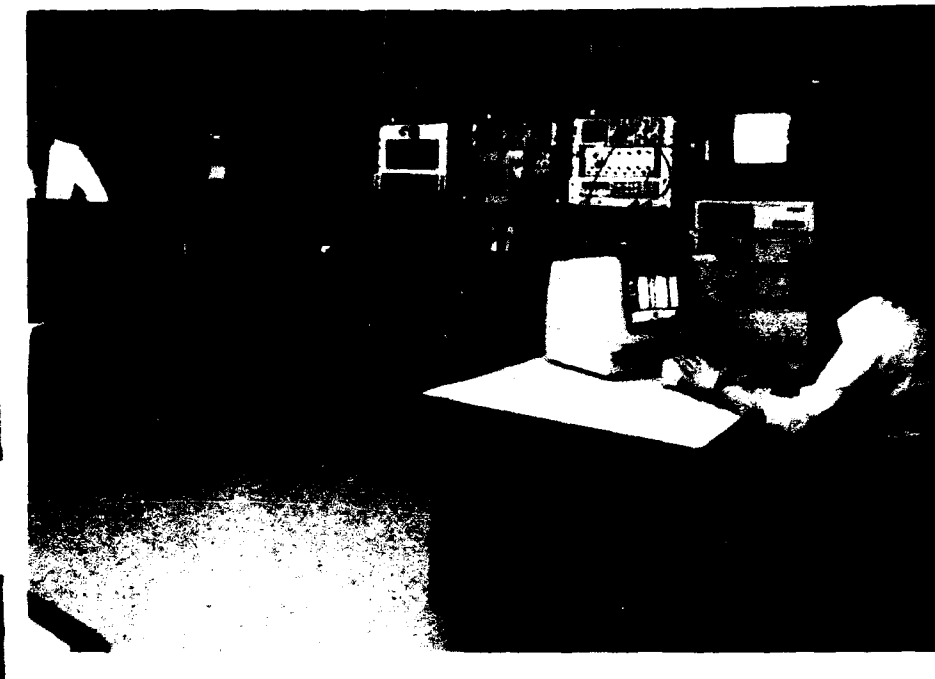
POINT OF CONTACT:

WL/MLLP

WPAFB, OH 45433-6533

(513) 255-9802

DSN 785-9802



Materials Lab NDE In-House Research Facility

FACILITY TYPE:

NDE X-Ray Computed Tomography

PURPOSE:

Establish applicability of x-ray computed tomography (CT) to meet critical NDE requirements; develop novel material and structural characterization techniques

FACILITY NAME:

Materials Laboratory X-Ray CT Facility

PRIMARY CAPABILITIES:

Specialization in the area of NDE x-ray CT for quantitative imaging of the internal structure of advanced materials and components

Parameters measured are density, atomic number and internal dimensions

SPECIAL/UNIQUE CAPABILITIES:

Large area conventional x-ray CT (objects 20in DIA and 34in H) with 0.01in resolution

Dual energy CT and radiography for chemical analysis and laminography for imaging of laminar structures

Microfocus CT for small objects (4in DIA and 8in H) with 0.001in resolution, also with laminography capabilities.

INSTRUMENTATION:

Laminography/dual energy x-ray CT system

Microtomography x-ray CT system (Available April 1990)

AVAILABILITY:

Primarily in-house research; available to U.S. government agencies

Available to university and industrial researchers on a non-interference basis

LOCATION:

BUILDING: 71 ROOM: Bay3&4

POINT OF CONTACT:

WL/MLLP

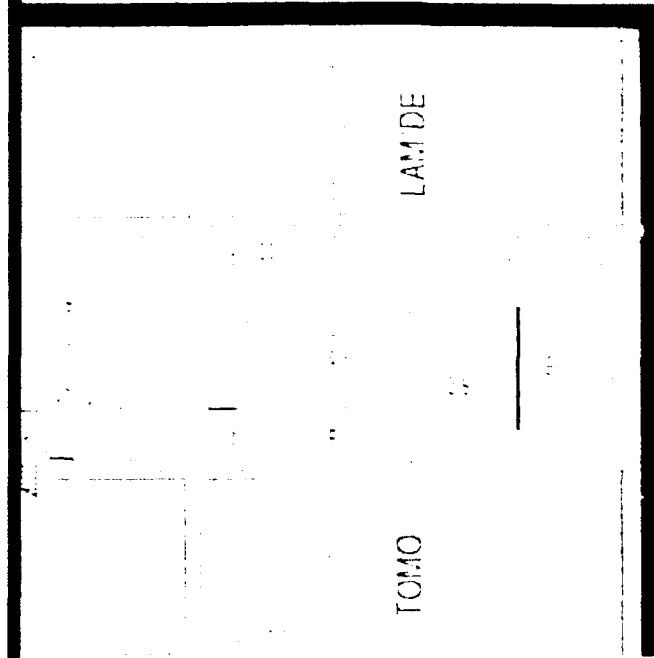
WPAFB, OH 45433-6533

(513) 255-9802

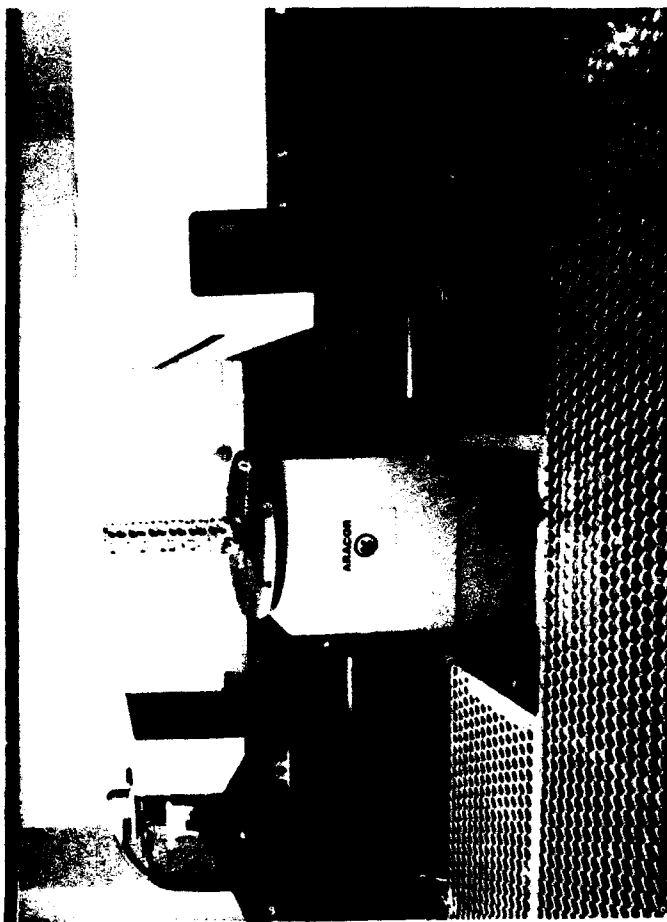
DSN 785-9802



MATERIALS LABORATORY COMPUTED TOMOGRAPHY RESEARCH FACILITY



FACILITY LAYOUT



LAMINOGRAPHY / DUAL ENERGY
(LAMDE)



MICROTOMOGRAPHY
(TOMO)

FACILITY TYPE:

Electron optics

PURPOSE:

Characterize advanced research materials utilizing electron microscopy and develop innovative microstructural characterization techniques

FACILITY NAME:

Materials Characterization Facility (Electron Optics Laboratory)

PRIMARY CAPABILITIES:

Specialization in the area of analytical microscopy for determining the orientation, volume fraction, crystal structure and composition of microscopic phases

SPECIAL/UNIQUE CAPABILITIES:

Analytical electron microscopy including transmission and scanning imaging and electron diffraction on metallic, organic composite and ceramic materials

Compositional X-ray analysis including both energy dispersive and wavelength dispersive spectroscopy

Fractographic analysis to determine the failure mechanisms of materials

INSTRUMENTATION:

Scanning Transmission Electron Microscope (STEMs and TEMs)

Field Emission Microscopes and Scanning Electron Microscopes

Electron microanalyzer/microprobe

AVAILABILITY:

Primarily in-house research

Available to U.S. Government agencies

LOCATION:

BUILDING: 655 ROOM: 064B

POINT OF CONTACT:

WL/MLLS

WPAFB, OH 45433-6533

(513) 255-1314

DSN 785-1314



Materials Characterization Facility
(Electron Optics Laboratory)

FACILITY TYPE:

15 KW laser: Flat-top beam

PURPOSE:

Evaluate laser/materials interactions and effects on advanced materials for future aerospace applications

FACILITY NAME:

Laser Hardened Materials Evaluation Laboratory I (LHMEL I)

PRIMARY CAPABILITIES:

15KW, continuous wave, carbon dioxide laser; run time of 10 sec at 15KW (nominal)

Average 30 air tests/day or 15 vacuum tests/day

Well characterized flat-top beam

1 to 11 cm spot sizes

SPECIAL/UNIQUE CAPABILITIES:

Vacuum environment test chamber (10 exp -4 Torr)

Dielectric material test chamber with microwave test set

50 Kpsi tensile test machine; subsonic blow-down wind tunnel

INSTRUMENTATION:

Burn-through detector; high-speed cameras (16mm)

Pyrometers; Honeywell Visicorder strip chart recorder

VHS Cassette recording for closed circuit TV; still photography

AVAILABILITY:

Available to US Government agencies and contractors

LOCATION:

BUILDING: 71A ROOM: BayABC

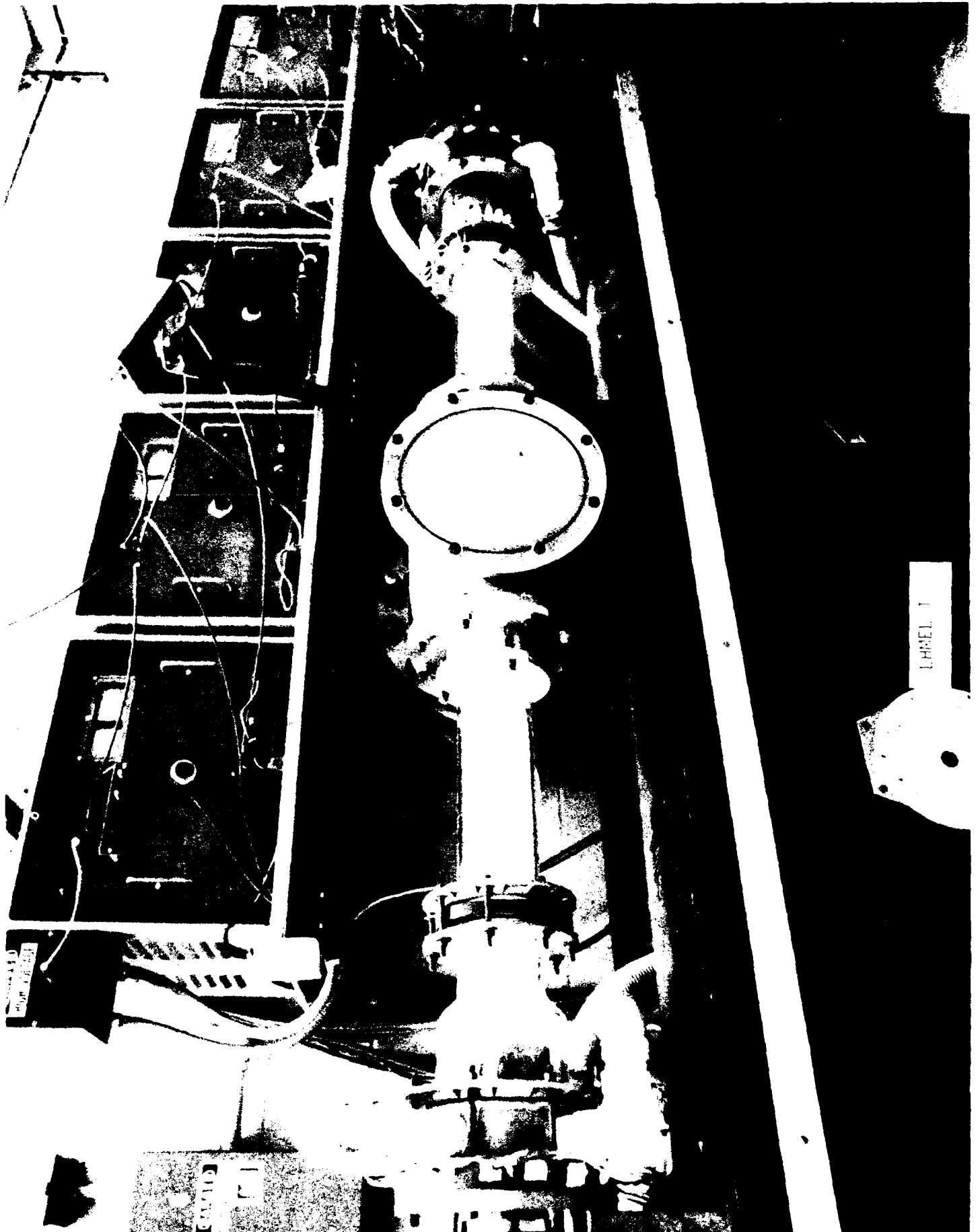
POINT OF CONTACT:

WL/MLPJ

WPAFB, OH 45433-6533

(513) 255-2334

DSN 785-2334



FACILITY TYPE:

100+ KW laser: Flat-top beam

PURPOSE:

Provide cost effective, well characterized, reliable laser for materials response phenomenology, geometric scaling, and sub-scale component testing

FACILITY NAME:

Laser Hardened Materials Evaluation Laboratory II (LHMEL II)

PRIMARY CAPABILITIES:

100+ KW, Continuous Wave, Carbon Dioxide Laser

Run time up to 100 seconds

Flat-top beam

1 to 50+ cm spot sizes

SPECIAL/UNIQUE CAPABILITIES:

7 ft by 9 ft chamber (to 1×10^{-6} Torr)

Wind tunnel, subsonic

INSTRUMENTATION:

High and low speed cameras (16mm); still photography; CC TV coverage (VHS); IR camera and Thermal Imaging System; pyrometers; burn through detectors

Beam diagnostics (power-on-target, spatial, and temporal profiles); data acquisition system (200+ channels)

AVAILABILITY:

Available to U.S. Government agencies and contractors

LOCATION:

BUILDING: 71A ROOM: BayABC

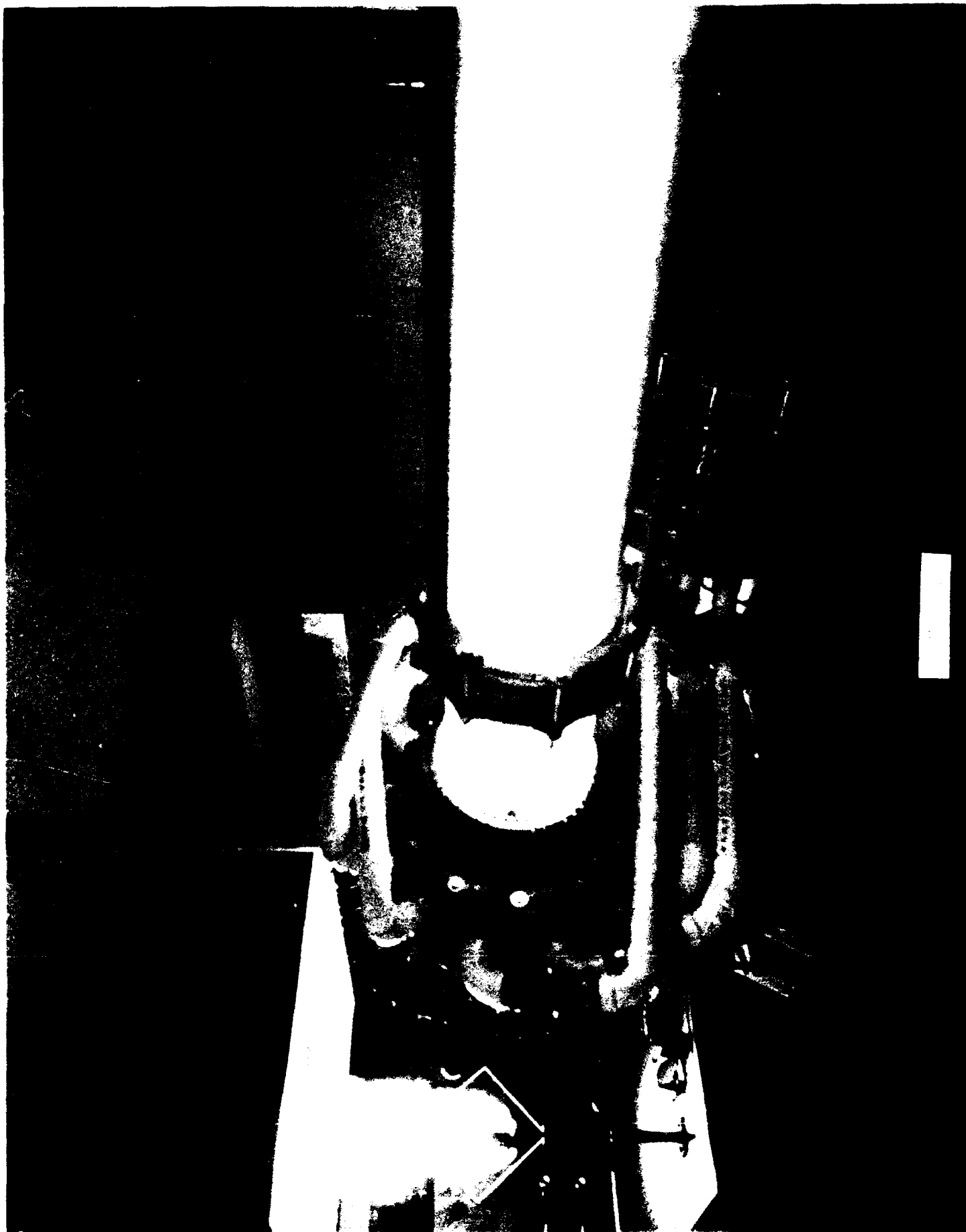
POINT OF CONTACT:

WL/MLPJ

WPAFB, OH 45433-6533

(513) 255-2334

DSN 785-2334



FACILITY TYPE:

Chemical Analysis

PURPOSE:

Perform chemical analyses on metallic and nonmetallic materials in support of research programs and current systems

FACILITY NAME:

Analytical Support Facility

PRIMARY CAPABILITIES:

Material identification

Multiple testing capabilities

SPECIAL/UNIQUE CAPABILITIES:

In support of accident investigations

Quick reaction response, on-site problem solving of unique, complex material compositions

INSTRUMENTATION:

Infrared spectroscopy, FTIR capability, Emission Spectroscopy, Atomic Absorption

Mass Spectrometry, Micro-Elemental Analysis, X-Ray Diffraction

AVAILABILITY:

Available to U.S. Government agencies

Available to NATO Defense Organizations

LOCATION:

BUILDING: 450 ROOM: 9B-21B

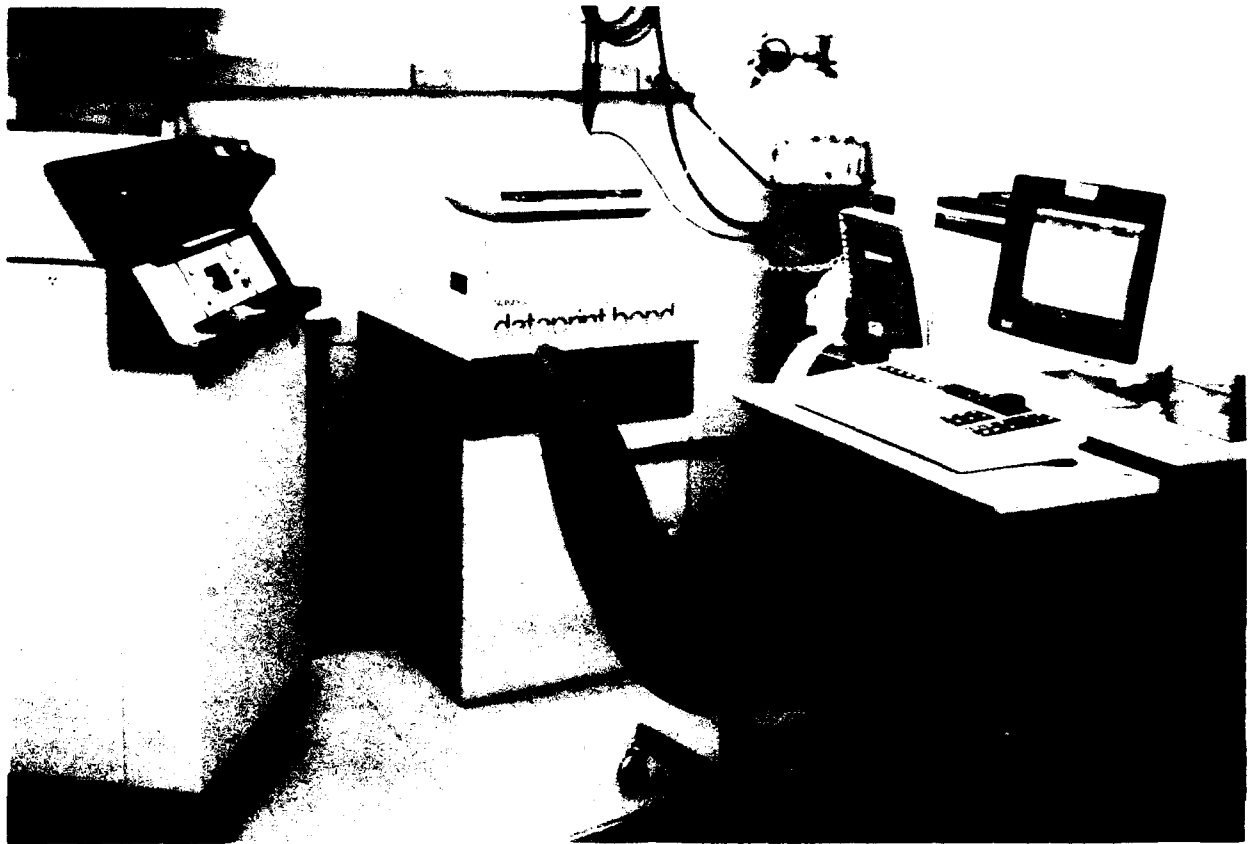
POINT OF CONTACT:

WL/MLSA

WPAFB, OH 45433-6533

(513) 255-3623

DSN 785-3623



Analytical Support Facility

FACILITY TYPE:

Failure Analysis

PURPOSE:

Detect and analyze failures in electrical and electronic equipment

FACILITY NAME:

Electronic Failure Analysis Facility

PRIMARY CAPABILITIES:

Identify and analyze electronic failures

Investigate materials selections

Investigate manufacturing process defects

Investigate accidents

SPECIAL/UNIQUE CAPABILITIES:

Special interface with ALCs

Unique capabilities for ISPOs

Many contacts with industry

INSTRUMENTATION:

Electrical parameterization , analog and digital

Scanning electron microscope, electron beam probing and voltage phase contrast of hybrid circuits

Accelerated life testing/environmental cycling

AVAILABILITY:

Available to U.S. Government agencies

Available to NATO Defense Organizations

LOCATION:

BUILDING: 652 ROOM: 17,47

POINT OF CONTACT:

WL/MLSA

WPAFB, OH 45433-6533

(513) 255-3487

DSN 785-3487



Electronic Failure Analysis Facility

FACILITY TYPE:

Structural Materials Investigation

PURPOSE:

Perform material analyses of failed metallic and nonmetallic structural components

FACILITY NAME:

Failure Analysis Facility

PRIMARY CAPABILITIES:

Fracture mode identification

Metallurgical studies of all types of materials

Investigation of composite structures

Analysis of duplex structures

SPECIAL/UNIQUE CAPABILITIES:

Quick reaction accident investigation capability

On-site problem solving capability as well as off-site

Composite material fracture characterization

INSTRUMENTATION:

Metallography; hardness testers

Light optic microscopes; electron optic microscope

Thermal testing devices

AVAILABILITY:

Available to U.S. Government agencies

Available to NATO Defense Organizations

LOCATION:

BUILDING: 652 ROOM: 28

POINT OF CONTACT:

WL/MLSA

WPAFB, OH 45433-6533

(513) 255-3623

DSN 785-3623



Failure Analysis Facility

FACILITY TYPE:

Rain Erosion

PURPOSE:

Test and evaluate materials and structures in hostile weather environments

FACILITY NAME:

Mach 1.2 Rain Erosion Research Facility

PRIMARY CAPABILITIES:

Variable velocity capability

Controlled duration exposure

Aircraft and missile components and materials

R&D materials

SPECIAL/UNIQUE CAPABILITIES:

Real time observation of erosion mechanisms; calibrated rainfield simulation

Classified capabilities

Support development of new materials; baseline data comparisons; qualification of proprietary materials/structures

INSTRUMENTATION:

Closed circuit television observation

Extensive monitoring of materials performance

Laboratory evaluation instrument (optical, electrical); video tape capability

AVAILABILITY:

Available to U.S. Government agencies and contractors

Available to industry

LOCATION:

BUILDING: 20A ROOM: N/A

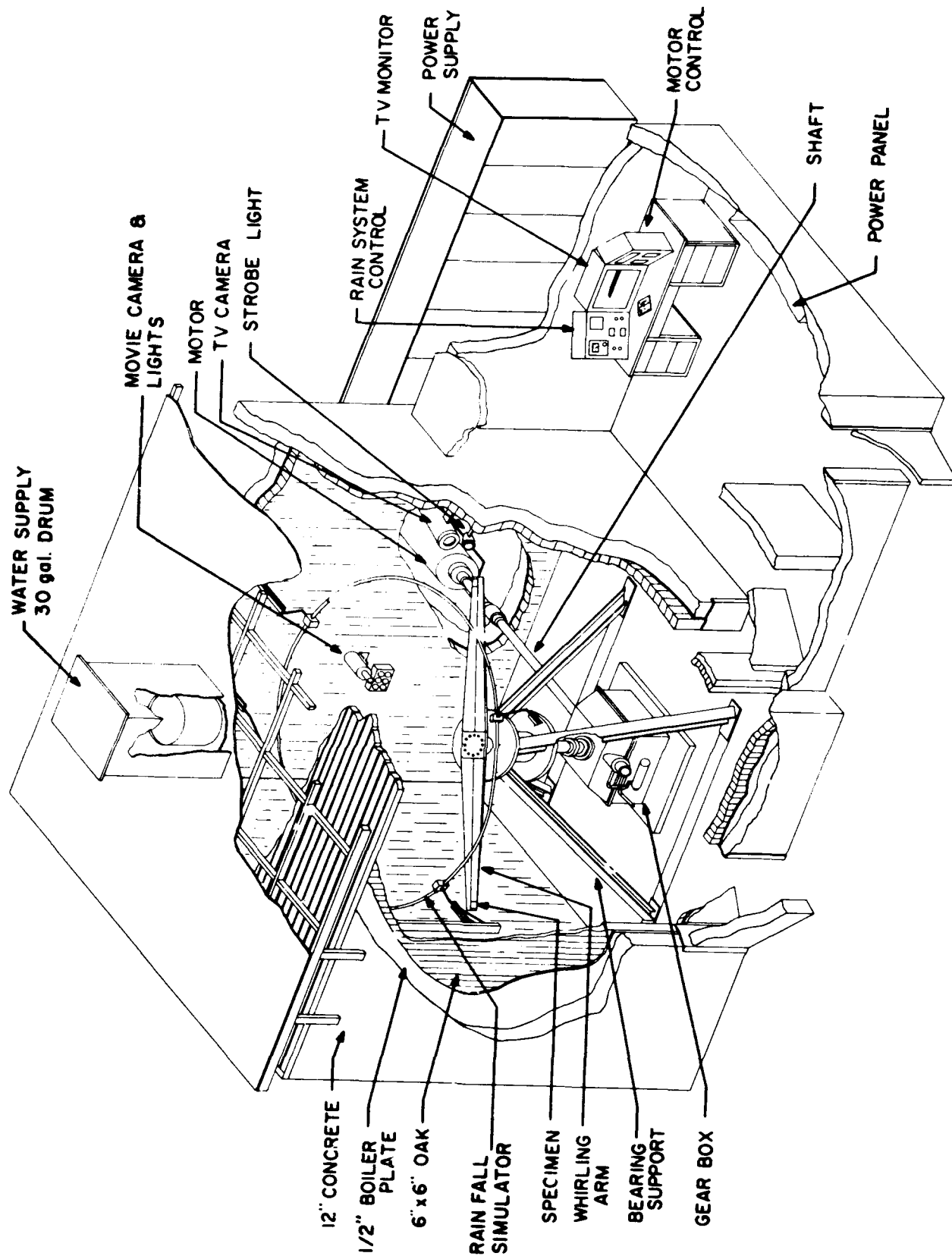
POINT OF CONTACT:

WL/MLSA

WPAFB, OH 45433-6533

(513) 255-3637

DSN 785-3637



Mach 1.2 Rain Erosion Test Facility

FACILITY TYPE:

Corrosion/Materials Compatibility/Coatings

PURPOSE:

Corrosion testing, materials compatibility, surface pretreatment, surface finishing, process chemicals, and aerospace maintenance chemicals

FACILITY NAME:

Materials Compatibility/Coatings Research Facility

PRIMARY CAPABILITIES:

Standardized testing; specification testing

Accelerated environmental simulation

New material/process screening

Multiple testing capabilities; corrosion testing and evaluation

SPECIAL/UNIQUE CAPABILITIES:

Three different forms of artificial weathering

Accelerated aging capability (humidity, temperature extremes, fluid immersions)

Accelerated corrosion tests (salt spray, filiform, stress corrosion)

INSTRUMENTATION:

Extensive monitoring and processing of test parameter data and final result presentation

AVAILABILITY:

Available to U.S. Government agencies

Available to Government contractors

LOCATION:

BUILDING: 652 ROOM: 51

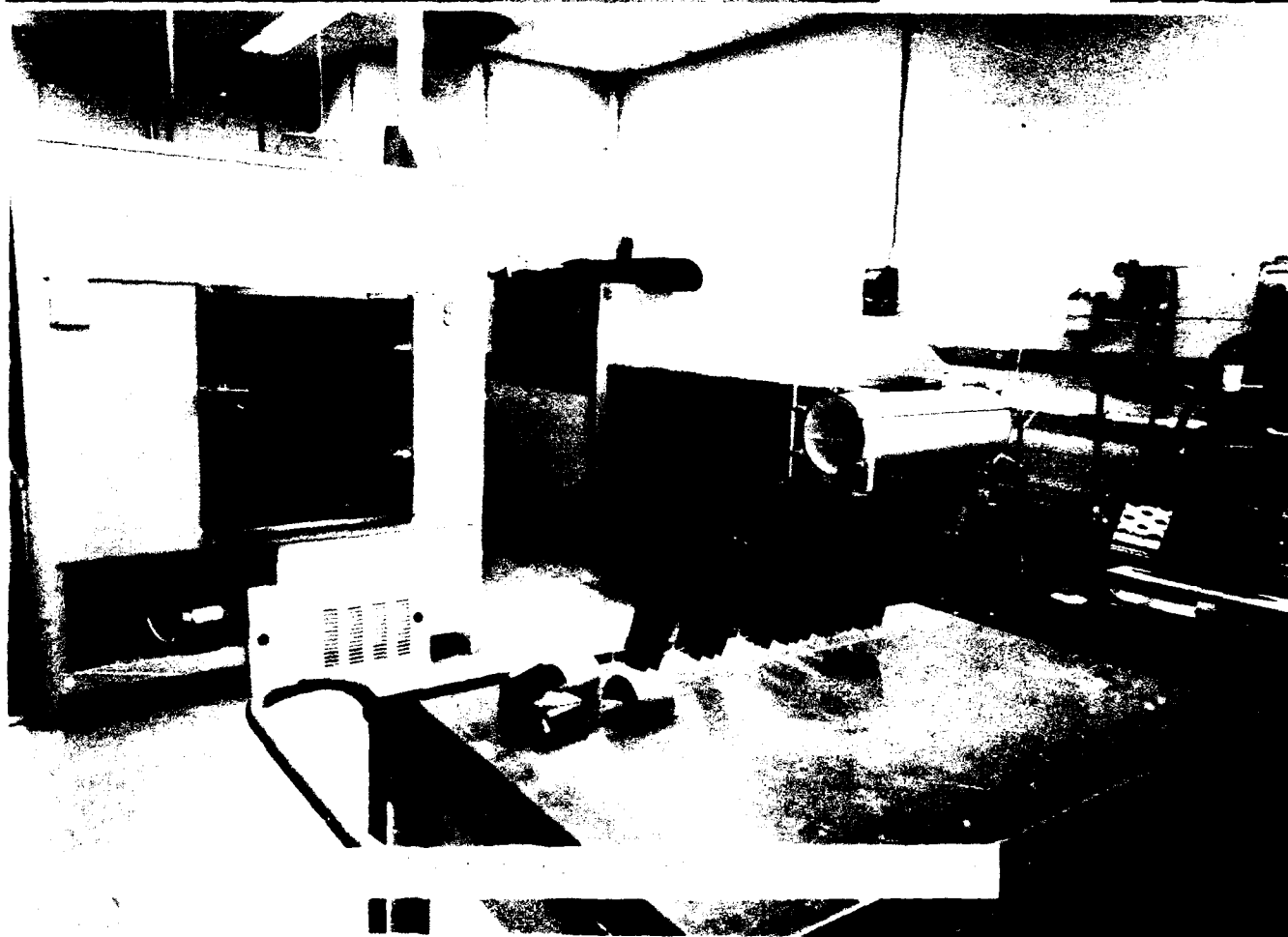
POINT OF CONTACT:

WL/MLSA

WPAFB, OH 45433-6533

(513) 255-5117

DSN 785-5117



Materials Compatibility/Coatings Test Facility

FACILITY TYPE:

Nondestructive Inspection

PURPOSE:

Characterize and/or detect defects in metallic and/or composite materials and/or structures

FACILITY NAME:

System Support Nondestructive Inspection Laboratory

PRIMARY CAPABILITIES:

Ultrasonic; eddy current; magnetic particle; penetrant

Radiography; acoustic emission; thermography; optical

SPECIAL/UNIQUE CAPABILITIES:

Portable and fixed laboratory capabilities for ultrasonic C-scan recordings and radiographic inspection

Only facility in the world authorized to evaluate sensitivity of penetrant inspection materials for DOD applications

INSTRUMENTATION:

Radiography - 5 to 320 KV; ultrasonics - 20 KHz to 20 MHz

Eddy currents - 10 Hz to 6 MHz (upon equipment arrival); acoustic emission, two sensor source locations

Penetrant/magnetic particle; UV lights, fixed or portable capability

AVAILABILITY:

Available to U.S. Government agencies

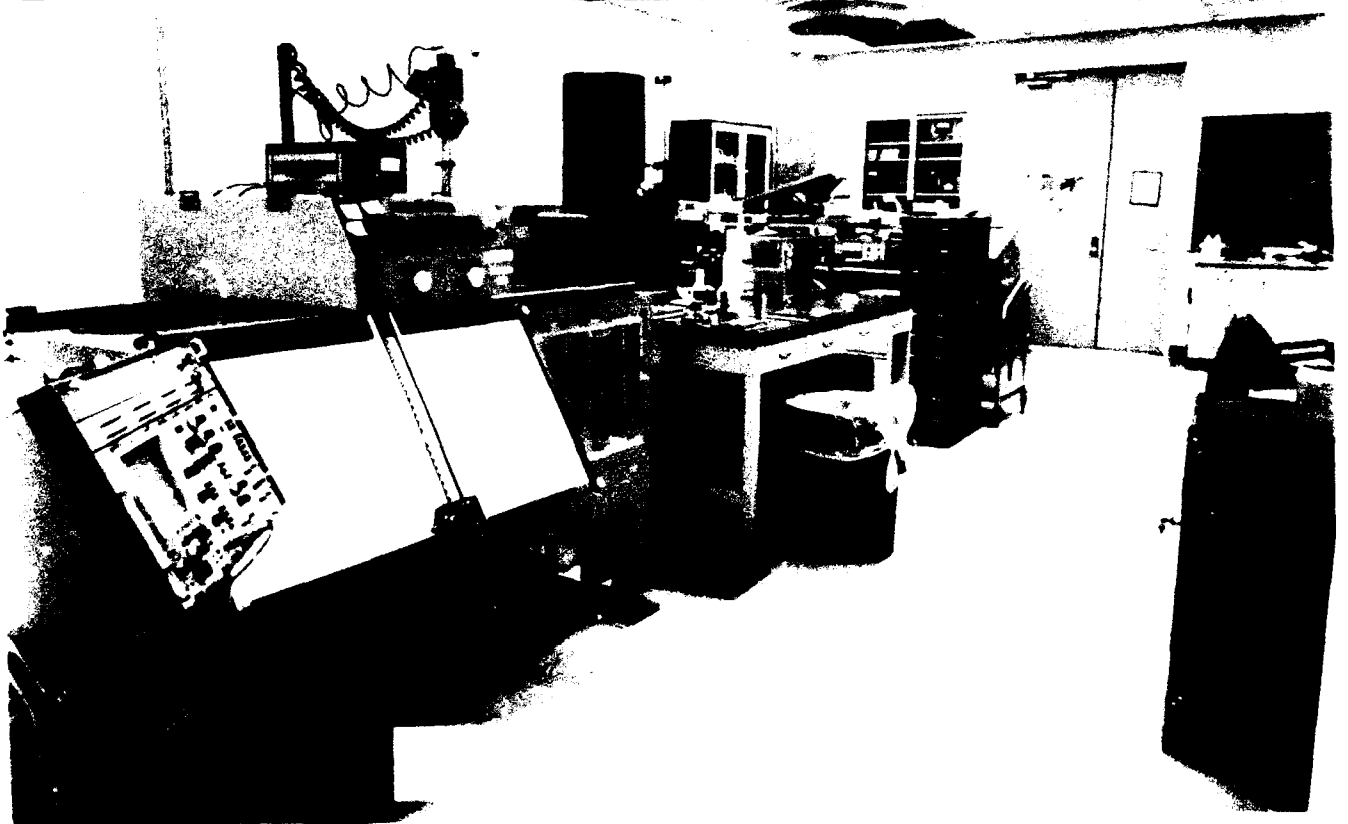
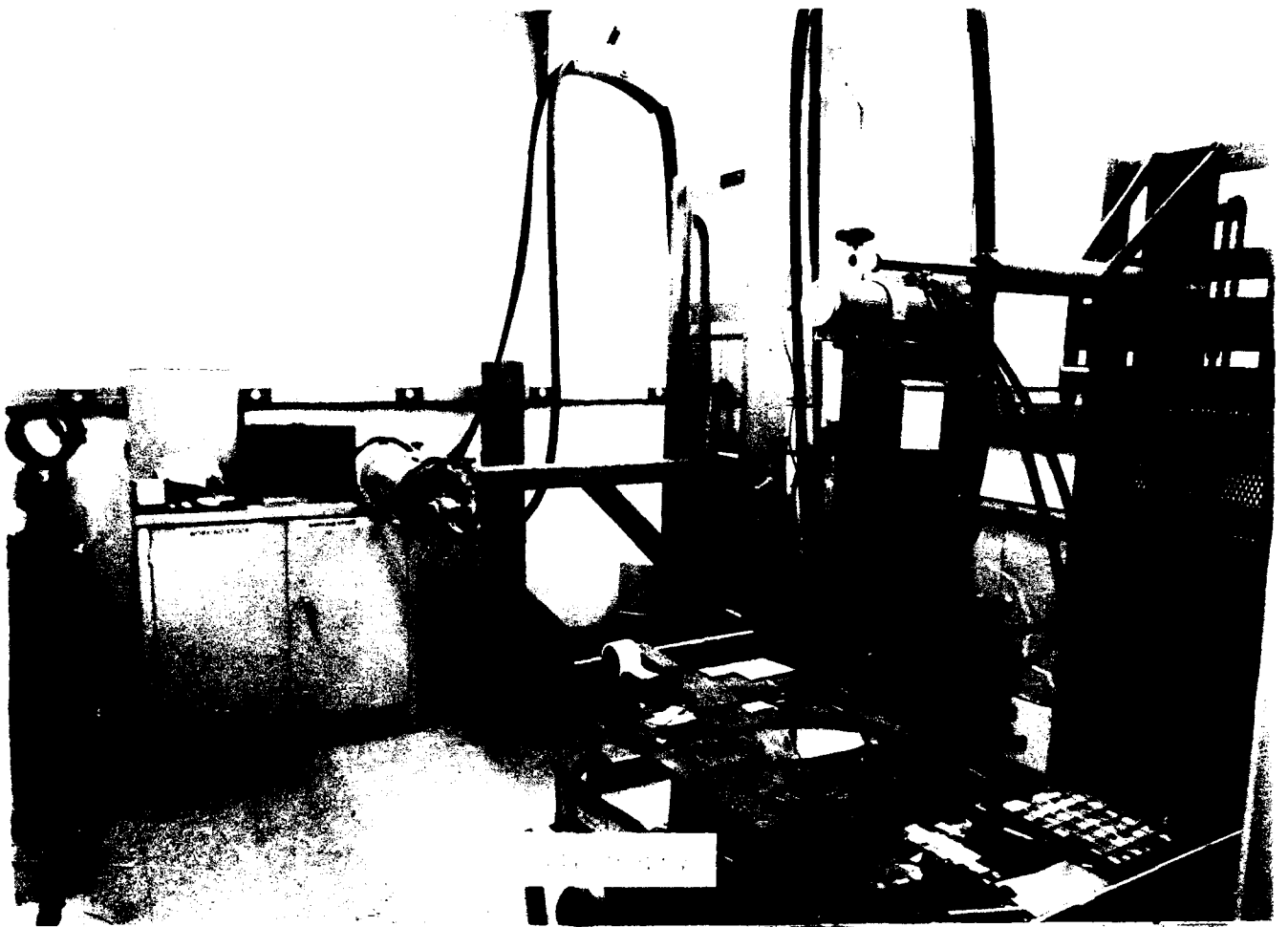
Available to Government contractors

LOCATION:

BUILDING: 652 ROOM: 42,43

POINT OF CONTACT:

WL/MLSA
WPAFB, OH 45433-6533
(513) 255-5117
DSN 785-5117



System Support Nondestructive Inspection Lab

FACILITY TYPE:

Mechanical Properties

PURPOSE:

Provide a quick reaction structural material evaluation capability

FACILITY NAME:

Engineering and Design Data Evaluation Facility

PRIMARY CAPABILITIES:

Conduct tensile, compression, bearing, shear, fatigue, fracture toughness, crack growth, impact, creep tests

Conduct stress rupture and stress corrosion cracking tests of materials

SPECIAL/UNIQUE CAPABILITIES:

Conduct tests to 3000 degF. in vacuum, inert gas and air

Complex spectrum loading for fatigue and crack growth evaluations

Controlled humidity chambers; liquid He cryogenic capability

INSTRUMENTATION:

Measure stress, strain, crack length, temperature and other appropriate parameters on a real time basis

AVAILABILITY:

Available to U.S. Government agencies

LOCATION:

BUILDING: 652 ROOM: G-17

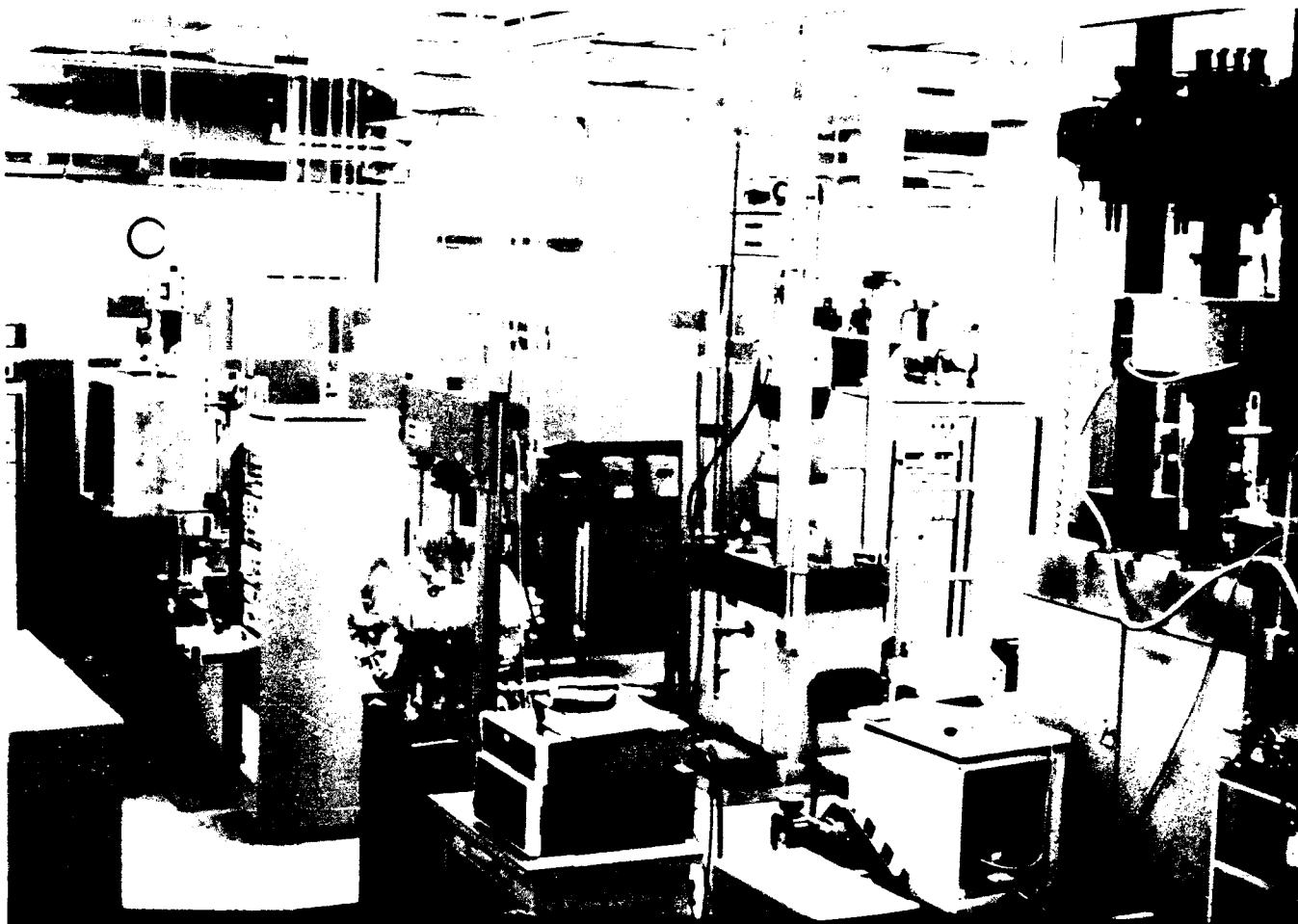
POINT OF CONTACT:

WL/MLSE

WPAFB, OH 45433-6533

(513) 255-5128

DSN 785-5128



Engineering and Design Data Evaluation Facility

PLANS
AND
PROGRAMS
DIRECTORATE

FACILITY TYPE:

Radar Cross Section

PURPOSE:

Development of radar cross section reduction technologies

FACILITY NAME:

Compact Radar Cross Section (RCS) Range

PRIMARY CAPABILITIES:

Pulse-gated broadband, 2 to 18 GHz with 10 mHz increments, frequency sweeps

Single frequency azimuth measurements

Five feet target quiet zone

Target pedestal rated to support a 500 pound target

SPECIAL/UNIQUE CAPABILITIES:

Downrange imaging capability

Capability to measure small targets with accuracy

INSTRUMENTATION:

Coherent data acquisition system to measure amplitude and phase at each frequency increment

Automated data acquisition/reduction

AVAILABILITY:

Primarily in-house research

Limited use by Government contractors

LOCATION:

BUILDING: 254 ROOM: CtrBay

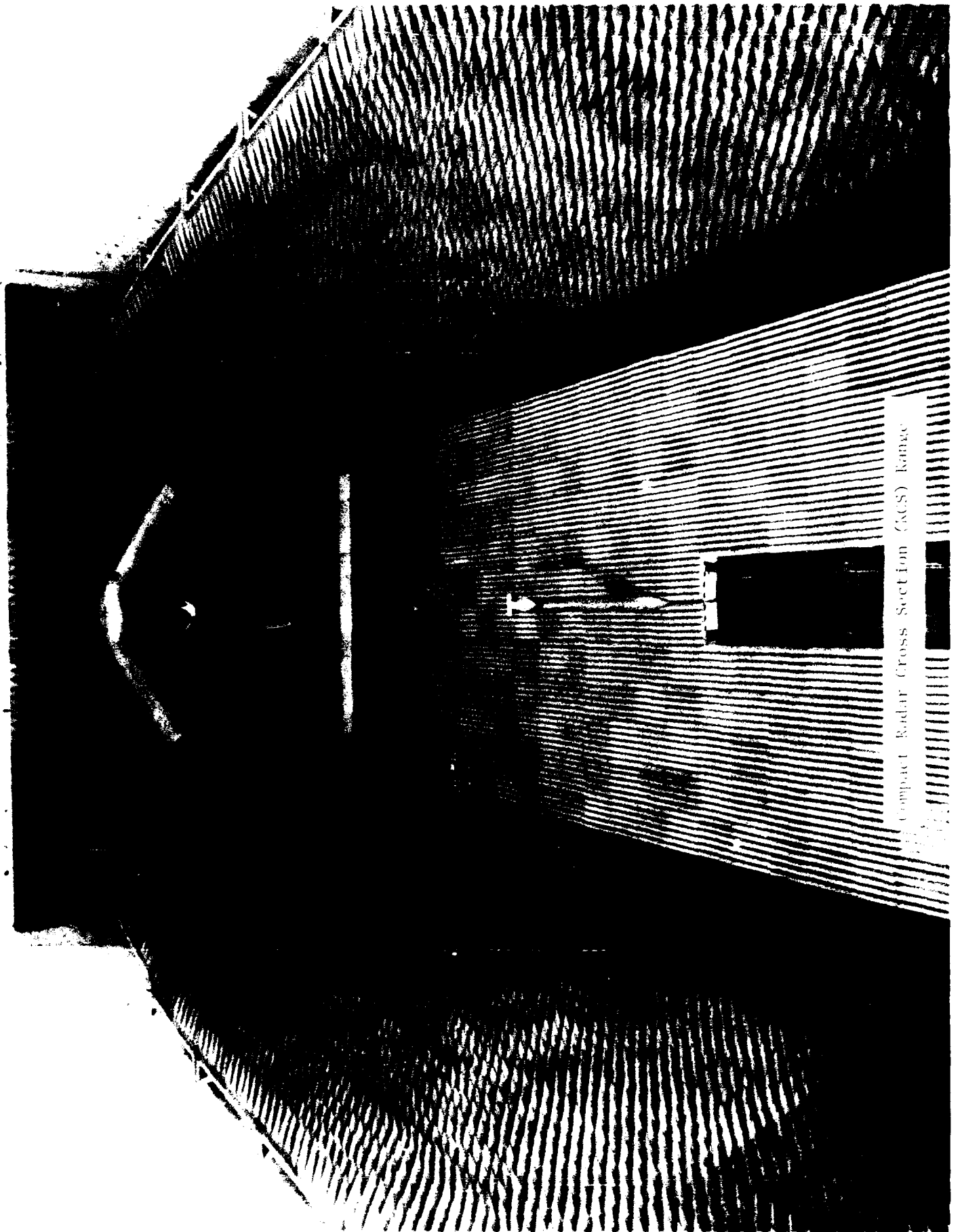
POINT OF CONTACT:

WL/XPN

WPAFB, OH 45433-6523

(513) 255-5076

DSN 785-5076



Compact Radar Cross Section (RCS) Range

FACILITY TYPE:

Radar Cross Section

PURPOSE:

Monostatic/bistatic far field radar cross section measurements

FACILITY NAME:

Far Field Range (FFR)

PRIMARY CAPABILITIES:

Radar cross section (RCS) measurements, 2 to 18 GHz continuous wave, as a function of azimuth angle

Pulse-gated broadband coherent RCS measurements, 2 to 18 GHz with 10 MHz steps

SPECIAL/UNIQUE CAPABILITIES:

Pulse-gated broadband measurements; continuous wave measurements

Bistatic measurements, 0 to 160 deg

Development of advanced measurement techniques/instrumentation

INSTRUMENTATION:

Radio frequency energy synthesized by two HP 8340 synthesized sweepers

Lintek Pulse Generator controls radio frequency switches; scattered radio frequency energy received by a Scientific Atlanta 1780 series receiver

All above devices controlled by an EVEREX/286 PC

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 254 ROOM: W Bay

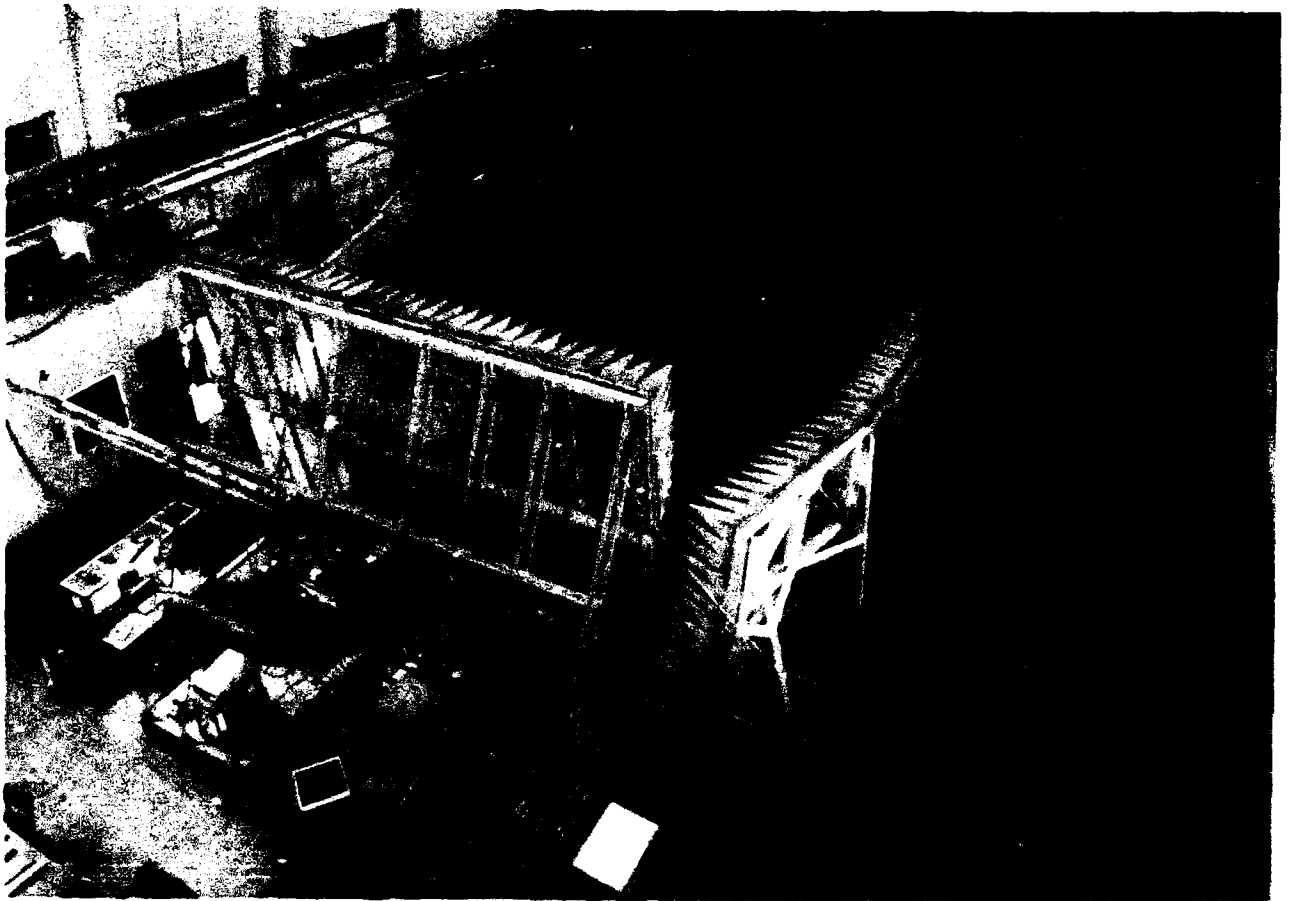
POINT OF CONTACT:

WL/XPN

WPAFB, OH 45433-6523

(513) 255-5076

DSN 785-5076



Far Field Range (FFR)

FACILITY TYPE:

Laser Radar Cross Section

PURPOSE:

Development and evaluation of laser radar signature reduction technologies

FACILITY NAME:

Indoor Laser Cross Section (LCS) Range

PRIMARY CAPABILITIES:

Makes pulsegated laser reflection measurements while rotating a target through 360 degrees

Laser radar cross section measurements on model aircraft

Monostatic laser reflectance of paints/coatings

Signature of aircraft components/sub assemblies

SPECIAL/UNIQUE CAPABILITIES:

Allows LCS measurement of targets up to three feet long and weighing less than 500 pounds

Turntable can be rotated from 0 to 1/3 RPM in either direction with 0.1 degree accuracy

Maximum distance from source to target is 50 feet; automated data collection/reduction

INSTRUMENTATION:

Multiple laser wavelengths are used including 0.532, 0.86, 1.064, and 10.6 micrometers

AVAILABILITY:

Primarily in-house research

Limited use by Government contractors

LOCATION:

BUILDING: 254 ROOM: Pit

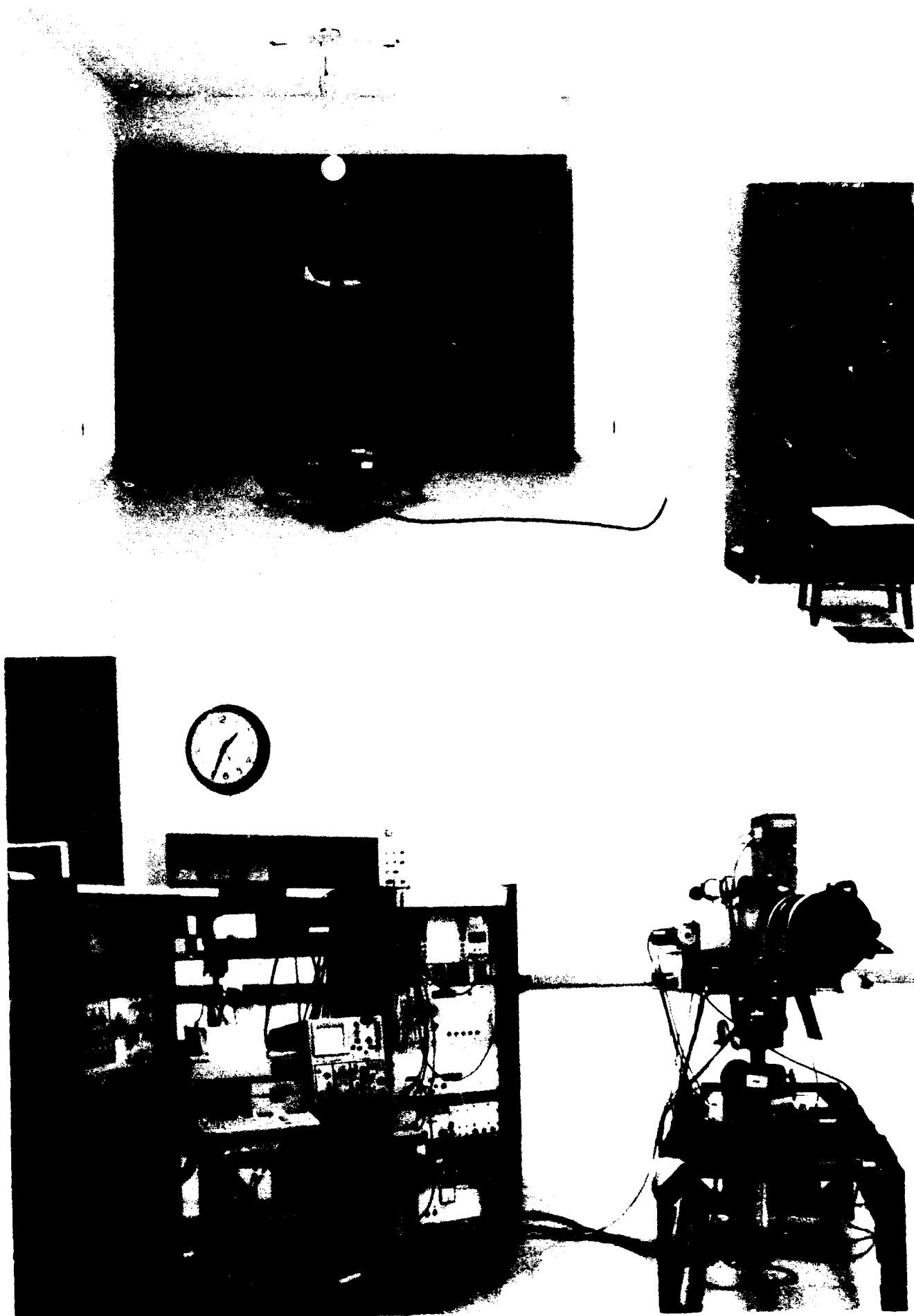
POINT OF CONTACT:

WL/XPN

WPAFB, OH 45433-6523

(513) 255-9333

DSN 785-9333



Indoor Laser Cross Section (LCS) Range

FACILITY TYPE:

RF/EO Materials Measurements

PURPOSE:

RF/EO characterization of electromagnetic properties of signature control materials

FACILITY NAME:

Materials Measurements Facility

PRIMARY CAPABILITIES:

Measurements of electrical properties of small donut sample or rectangular sample

Measurements from 45 MHz to 26.5 GHz

SPECIAL/UNIQUE CAPABILITIES:

Make mu and epsilon measurements

INSTRUMENTATION:

HP 8510A and HP 8510B

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 254 ROOM: Pit

POINT OF CONTACT:

WL/XPN

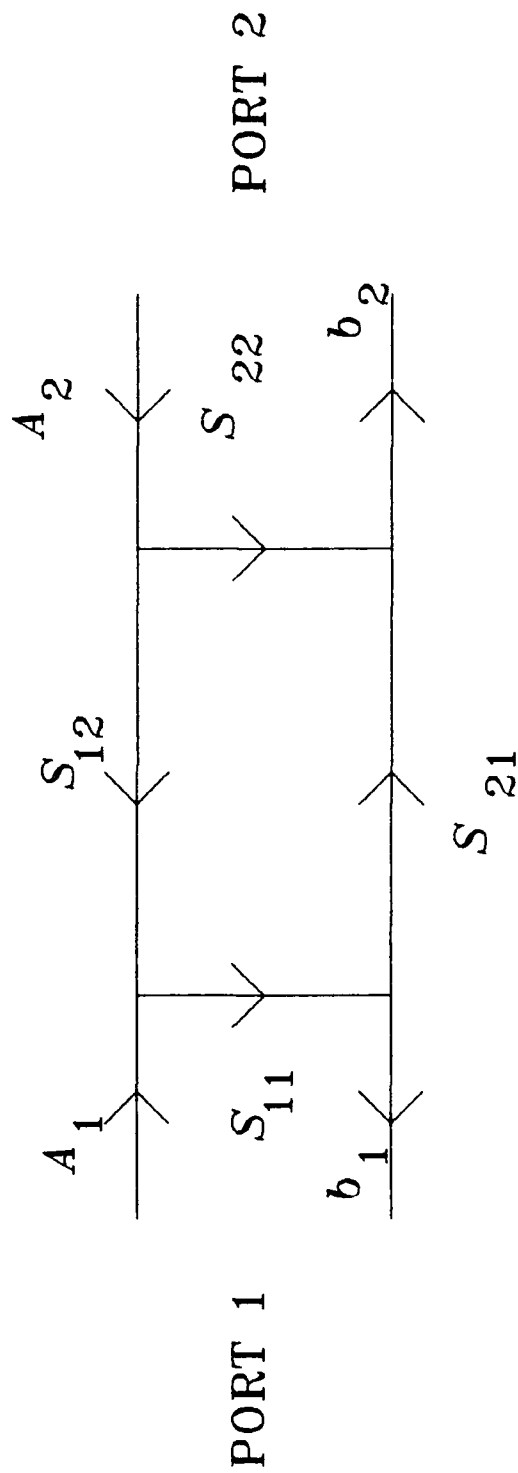
WPAFB, OH 45433-6523

(513) 255-5076

DSN 785-5076

FREQUENCY DOMAIN MATERIAL MEASUREMENTS

AUTOMATED NETWORK ANALYZER



MATERIALS MEASUREMENT FACILITY

FACILITY TYPE:

Laser Radar Cross Section

PURPOSE:

Development and evaluation of laser cross section technologies on operational vehicles

FACILITY NAME:

Outdoor Laser Cross Section (LCS) Range

PRIMARY CAPABILITIES:

Laser radar cross section measurements on operational aircraft

Laser reflection measurements on large components/sub assemblies

SPECIAL/UNIQUE CAPABILITIES:

Turntable: 60 ft by 20 ft load bearing area capable of supporting 110,000 pounds; rotates from 0 to 1/3 RPM in either direction with 0.1 degree accuracy

Size and weight limits of turntable allow measurement of aircraft up to and including a C-130

Turntable located on southwest end of taxiway 8, Area C

INSTRUMENTATION:

Instrumentation van may be placed 1000, 2000, or 3000 feet from turntable

Multiple laser wavelengths used, including 0.532, 0.85, 1.064, and 10.6 micrometers

AVAILABILITY:

Primarily in-house research

Limited use by Government contractors

LOCATION:

BUILDING: 254 ROOM: W Bay

POINT OF CONTACT:

WL/XPN

WPAFB, OH 45433-6523

(513) 255-9333

DSN 785-9333



Outdoor Laser Cross Section (LCS) Range

**SOLID STATE
ELECTRONICS
DIRECTORATE**

FACILITY TYPE:

Microelectronics

PURPOSE:

Design, fabricate and test microelectronic devices, integrated circuits. Maintain a state-of-the-art computer aided design (CAD) facility

FACILITY NAME:

Microelectronics Computer Aided Design (CAD) and Research Facility

PRIMARY CAPABILITIES:

Very Large Scale Integrated Circuit (VHSIC) design

Simulation, logic synthesis, VHSIC Hardware Description Language, layout synthesis, built-in-test synthesis, and automatic place and route

Development of GaAs-based heterojunction field effect transistors, heterojunction bipolar transistors, and resonant tunneling devices

High speed testing of devices, circuits, and analog-to-digital converters

SPECIAL/UNIQUE CAPABILITIES:

Silicon compilation of integrated circuits

Automated wafer parametric testing; automated analog-to-digital converter testing

Reverse engineering of IC designs

INSTRUMENTATION:

Networked engineering workstations with design software from Mentor, Compass, Valid, Synopsis, and Analog

Electroglass 2001X Automatic Prober, Tektronics DAS 9200 Logic Analyzer, HP4192 Impedance Analyzer, HP4085 Switching Matrix, HP8181A Data Generator Extender

Stanford Research Systems SR530 Lock-In Amplifiers, HP 8620C Sweep Oscillator, HP8180A Data Generator, HP8081A Rate Generator, HP8350B Sweep Oscillator

AVAILABILITY:

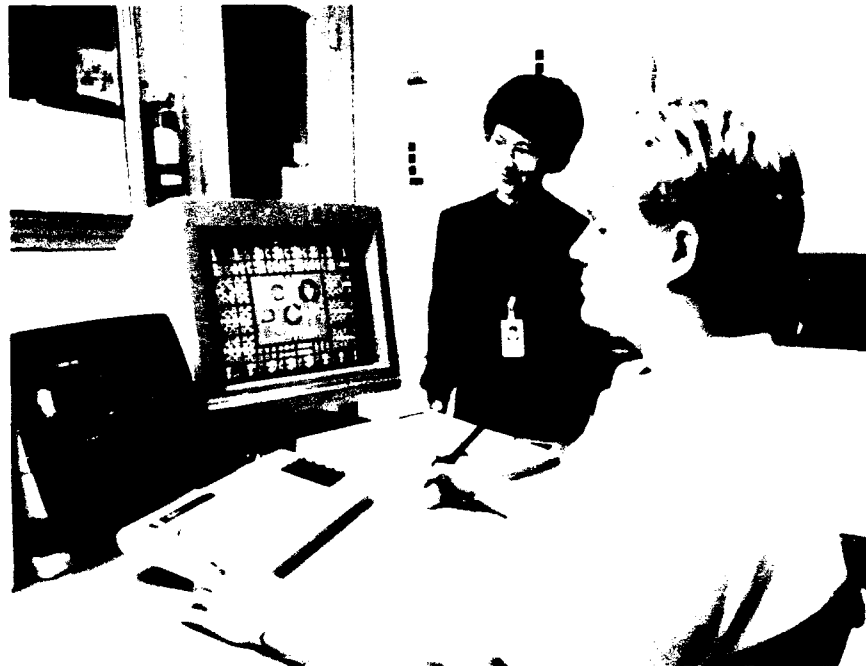
Primarily in-house research

LOCATION:

BUILDING: 620 ROOM: S2Z41

POINT OF CONTACT:

WL/ELE
WPAFB, OH 45433-6543
(513) 255-7142
DSN 785-7142



Computer-Aided Design Facility

Microelectronics Computer-Aided Design (CAD) and Research Facility

FACILITY TYPE:

Microwave/Millimeter Wave

PURPOSE:

Design, fabricate and/or test microwave and millimeter wave electronic components and integrated circuits

FACILITY NAME:

Microwave/Millimeter Wave Laboratory

PRIMARY CAPABILITIES:

Design and fabricate solid state devices and integrated circuits operating in the 0.1 to 100 GHz range involving III/V compound semiconductor materials

Device correlation analysis; microwave device/process modeling; GaAs material evaluation

Design, fabrication and testing of GaAs MIMICs; testing of general microwave/millimeter wave components

SPECIAL/UNIQUE CAPABILITIES:

RF on-wafer testing of MIMICs using a cascade automatic prober and HP 8510 Vector network analyzer

Overstress testing of microwave devices and MIMICs

RF evaluation of high temperature superconductors

INSTRUMENTATION:

FMI scalar network analyzer (1-40 GHz); HP 8510 vector network analyzers (0.1-75 GHz); Cascade on-wafer RF prober

General purpose microwave/millimeter wave test equipment

Computer-aided design workstations

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 620 ROOM: S2E38

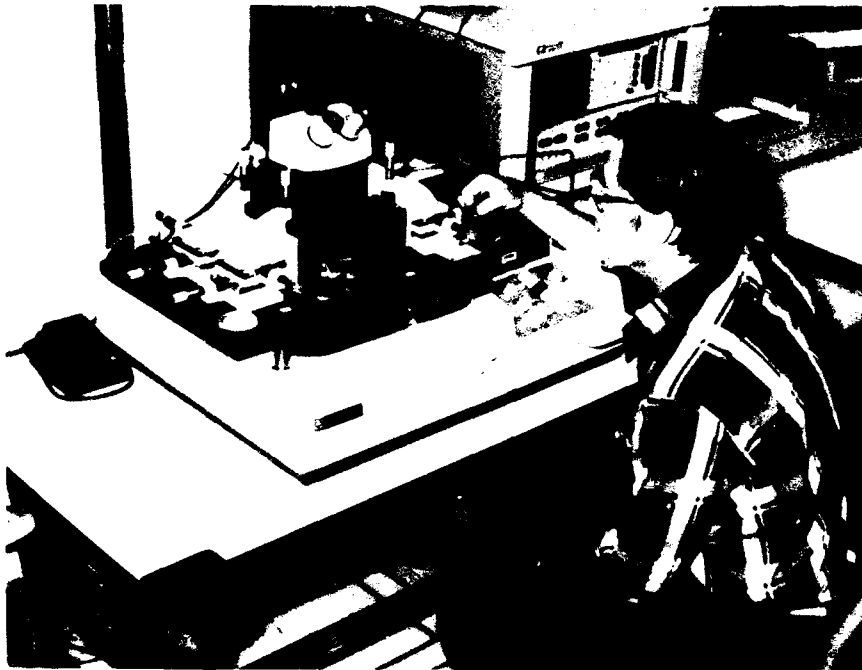
POINT OF CONTACT:

WL/ELM

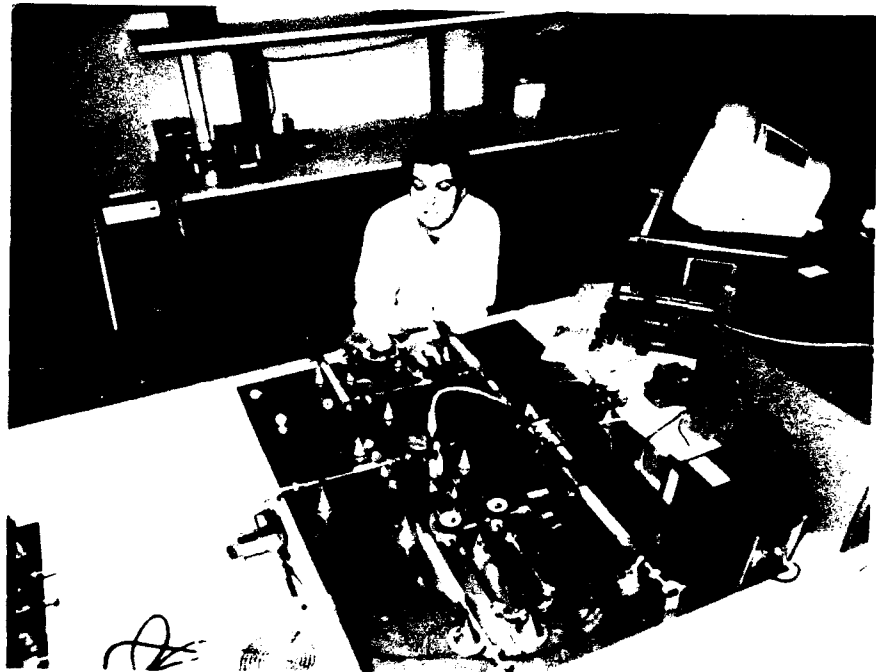
WPAFB, OH 45433-6543

(513) 255-4831

DSN 785-4831



Microwave Testing



Millimeter Wave Testing

Microwave/Millimeter Wave Laboratory

FACILITY TYPE:

Coherent and Non-Coherent Optical Device Research

PURPOSE:

Exploratory development of lasers, optical processing and control devices, optoelectronic integrated circuits, detectors and detector arrays

FACILITY NAME:

Opto-Electronic Research Facilities

PRIMARY CAPABILITIES:

Characterization and evaluation of laser and non-linear optical materials

Optical device evaluation, including surface metrology, optical waveguide elements, optical logic and active optical processing evaluation

Infrared and ultraviolet optical detector characterization, evaluation and optimization, including optical Fourier transform measurement facility

SPECIAL/UNIQUE CAPABILITIES:

Optical excitation spectroscopy, time-resolved, for laser materials from 4 degrees Kelvin through elevated temperatures

Absorption, fluorescence and transmission spectroscopy from UV through long wave infrared

Interferometric and scatterometric surface analysis together with topographical surface microscopy for both insulating and conducting/semiconducting samples

INSTRUMENTATION:

Multiple spectrometers and spectrophotometers; laser sources from visible through long wave infrared (10.6 micrometers)

Bidirectional reflectance distribution function measurement instrumentation for 4 inch surfaces at 3 visible wavelengths; Zygo surface interferometer

AVAILABILITY:

Primarily in-house research

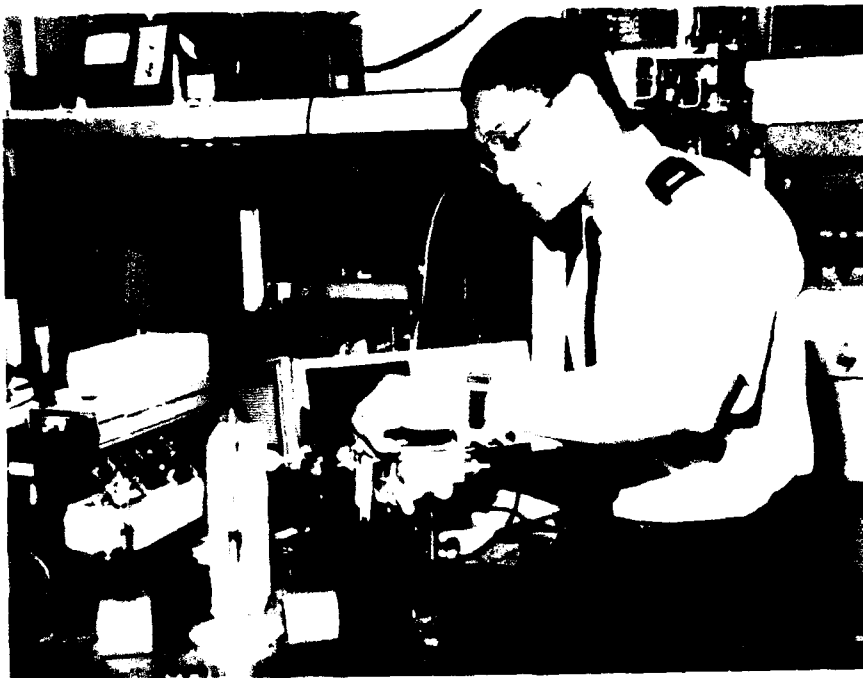
Cooperative experiments with other Government agencies and Universities

LOCATION:

BUILDING: 22B ROOM: C210

POINT OF CONTACT:

WL/ELO
WPAFB, OH 45433-6543
(513) 255-3086
DSN 785-3086



Solid State Laser Development and Characterization



Opto-Electronic Fabrication and Characterization

Opto-Electronic Research Facilities

FACILITY TYPE:

Device and Semiconductor Research

PURPOSE:

Research on compound semiconductors and semiconductor structures, advanced microwave, high speed digital and novel electro-optic devices

FACILITY NAME:

Device Research Laboratory

PRIMARY CAPABILITIES:

Theoretical and experimental research on III-V semiconductor structures and devices; development of advanced electronic and electro-optical devices

Extensive theoretical and experimental growth and characterization of electronic and optical properties of III-V materials and devices

SPECIAL/UNIQUE CAPABILITIES:

Molecular beam epitaxy of components of gallium, indium, aluminum, arsenic and antimony; ion implantation; metal and dielectric deposition

Reactive ion etching; nanometer lithography; modeling of device physics

Conventional and rapid thermal annealing; scanning electron microscopy and electrical testing

INSTRUMENTATION:

JEOL 5 DIIU-A e-beam; Varian 360 and GEN II MBE; full complement of conventional semiconductor process equipment

Time resolved high resolution photoluminescence; photoreflectance; Hall measurement apparatus; Fourier transform infra-red spectroscopy

AVAILABILITY:

Primarily in-house research

LOCATION:

BUILDING: 620 ROOM: NE2G4

POINT OF CONTACT:

WL/ELR
WPAFB, OH 45433-6543
(513) 255-6871
DSN 785-6871



Device Research Electron Beam Facility



Device Research Facility

Device Research Laboratory

FACILITY NAME INDEX

FACILITY NAME.....	PAGE
Advanced Guidance Research Facility.....	122
Advanced Warhead Experimentation Facility.....	142
Aeroballistics Research Facility (ARF).....	110
Air Breathing Combustor Research Facility.....	30
Aircraft Electrical Power Laboratory.....	8
Aircraft Survivability Research Facility.....	324
Aircraft Transparency Durability Research Facility.....	314
Ammonia Research Facility.....	18
Analytical Support Facility.....	360
Artificial Intelligence Technology Laboratory.....	168
Augmentor Test Rig.....	42
Ballistics Experimentation Facility (BEF).....	112
Basic Research Facility.....	150
Battery Laboratory.....	20
Bearing and Gear Material Fatigue Tester.....	58
Carriage and Release Test Facility (CART).....	120
Cathode Test Stand.....	24
Center of Gravity Inertia Meter.....	316
Ceramic Composite Research Laboratory.....	338
Combined Environment Acoustic Test Facility.....	240
Combustion/Spray Diagnostics Laboratory.....	44
Combustion Fundamentals Laboratory.....	38
Combustion Research Facility.....	40
Communication Systems Evaluation Laboratory (CSEL).....	174
Compact Radar Cross Section (RCS) Range.....	376
Component Research Air Facility.....	2
Compressor Aerodynamic Research Laboratory.....	102
Compressor Research Facility (CRF).....	104
Compressor Research Facility Component Test and Structures Lab.....	106
Computational Fluid Dynamics (CFD) Facility.....	114
Control Integration and Assessment Laboratory.....	268
Control Systems Architecture Laboratory.....	274
Control Systems Integration Laboratory.....	276
D-Bay Sea Level Engine Stand.....	98
DOD Landing Gear Development Facility.....	310
Device Research Laboratory.....	394
Diagnostics Research Facility.....	152
Display Evaluation Laboratory.....	184
Dynamic Infrared Missile Evaluator (DIME).....	228
Dynamic/Combat Electromagnetic Environment Simulator (DEES/CEESIM).....	212
Dynamics Data Recovery and Analysis Facility.....	242
Elastomers Facility.....	332
Electro-Optical Receiver Laboratory.....	220
Electro-Optical Research Facility.....	126
Electro-Optical Signature Analysis System (EOSAS).....	232
Electronic Combat Research Simulation Laboratory (ECSRL).....	214
Electronic Defense Evaluator (EDE).....	216
Electronic Failure Analysis Facility.....	362
Electronic Warfare Anechoic Chamber (EWAC).....	230
Elevated Temperature Test Facility.....	260
Embedded Computer Resources Support Improvement Facility (ESIP).....	172

Engineering and Design Data Evaluation Facility.....	372
Environmental Sciences Facility.....	146
EO Sensors Evaluation Range.....	198
Experimental Materials Processing Lab.....	340
Explosive Dynamics Facility.....	132
Explosive Processing Facility.....	134
Explosive Research Properties Facility.....	136
Failure Analysis Facility.....	364
Far Field Range (FFR).....	378
Fatigue and Fracture/Extreme Environment Test Facility.....	238
Ferrography Facility.....	70
Fighter Aircraft Cockpit: Single-Seat Strike Fighter (S3F).....	298
Fire Control Simulation Facility (FICSIM).....	208
Flight Control Actuation and Hydraulic Systems Facility.....	278
Flow Visualization Research Facility.....	32
Fluid and Lubricant Development, Characterization, and Validation Facility.....	334
Fuels Research Laboratory.....	46
Fuels Storage Oven.....	48
Fuels Thermal and Catalytic Research Laboratory.....	58
Full-Scale Bearing Tester.....	60
Fuzes Research and Development Facility.....	140
Gas Chromatographic Atomic Emission Detector (GC/AED).....	72
Hangar 4B Anechoic Chambers.....	222
Helicopter Rotor Test Facility.....	4
High Energy Research Facility.....	154
High Power Laboratory.....	26
High Pressure Viscometer.....	62
High Strain Rate Materials Facility.....	144
High Temperature Bearing and Gear Material Wear and Fatigue Tester...	64
High Temperature High Speed Bearing Test Rig.....	74
High Temperature Materials Laboratory.....	342
Hydraulic Simulator.....	318
Hydrodynamic Test Facility.....	290
Hydrogenation Research System (HRS).....	52
Inertial Navigation Facility.....	118
Infrared Laboratory.....	200
Indoor Laser Cross Section (LCS) Range.....	380
Information Processing Laboratory.....	186
Instrumentation Laboratory.....	188
Instrumentation Technology Research Facility.....	124
Integrated Circuit Exploitation Facility.....	224
Integrated Defensive Avionics Laboratory (IDAL).....	218
Integrated Electromagnetic System Simulator (IESS).....	176
Integrated Electronics Environmental Laboratory.....	306
Integrated Test Bed (ITB).....	182
Interior Ballistics and Impact Facility	116
J57 Engine Simulator.....	76
Kinetic Kill Vehicle Hardware-in-the-Loop Simulation Facility (KHILS).....	160
Large Acoustic Test Facility.....	244
Laser Communications Laboratory.....	178
Laser Hardened Materials Evaluation Laboratory I (LHMEL I).....	356
Laser Hardened Materials Evaluation Laboratory II (LHMEL II).....	358
Laser Optics Laboratory	170
Laser Radar (LADAR) Development and Evaluation Research Facility...	128

Laser Radar Research Lab (LADAR).....	202
Lubricant Analysis Facility.....	78
Lubricant Friction and Wear Facility.....	80
Lubricant Friction and Wear Testing Facility.....	82
Lubricant Stability Analysis Facility.....	84
Mach 1.2 Rain Erosion Test Facility.....	366
Mach 3, High Reynolds Number Facility.....	284
Mach 6, High Reynolds Number Facility.....	286
Materials Behavior Research Laboratory.....	348
Materials Characterization Facility (Electron Optics Laboratory)....	354
Materials Characterization Facility (Metallography Laboratory)....	344
Materials Compatibility/Coatings Research Facility.....	368
Materials Laboratory NDE In-house Research Facility.....	350
Materials Laboratory X-Ray CT Facility.....	352
Materials Measurements Facility.....	382
Mechanics of Composites Test Laboratory.....	328
Metallurgical Research Laboratory.....	346
Microelectronics Computer Aided Design (CAD) and Research Facility..	388
Microprocessor Applications of Graphics and Interactive Communication (MAGIC).....	300
Microscopy Facility.....	86
Microwave/Millimeter Wave Laboratory.....	390
Miniaturized Turbine Engine Lubricating System Simulator Facility....	88
Mini-Liquid Hydrogen Test Facility.....	262
Mobile Data Acquisition.....	246
Mobility Development Laboratory.....	312
Modal Analysis System.....	190
Model Fabrication Facility.....	148
Molecular Beam Epitaxy and Surface Analysis Instrument.....	330
Molecular Emission Spectrophotometer.....	90
Multi-Shot Research Facility.....	156
Neural Network and Signal Processing Facility.....	162
NT-33A In-Flight Simulator.....	270
Optical Diagnostics Laboratory.....	10
Optical EHD Test Rig.....	66
Optical Radar Research Facility.....	204
Optical Research Laboratory.....	206
Opto-Electronic Research Facilities.....	392
Outdoor Laser Cross Section (LCS) Range.....	384
Panoramic Cockpit Control and Display System (PCCADS).....	302
Phoenix Test Rig.....	54
Photomechanics Facility.....	248
Photo Optics Modification Center.....	192
Plasma Physics Laboratory.....	12
Power Semiconductor Laboratory.....	14
Propeller Test Facility.....	6
Prototype High Temperature Acoustic Facility.....	250
Quarter Scale Acoustic Test Chamber.....	252
Radar Analysis and Signal Processing Laboratory (RASPL).....	210
Radio Frequency/Millimeter Wave (RF/MMW) Facility.....	130
Ramjet Combustion Research Facility.....	34
Random Fatigue Test Facility.....	254
Reduced Scale Aircraft Engine/Airframe Fuel System Simulator (RSS)...	56
RF Receiver/Processor Laboratory.....	226
Satellite Communications Facility.....	180
Sensor Quality Analysis Laboratories (SEQAL I and II).....	196

Sensor/System Dynamic Analyzer (DA).....	194
Small Acoustic Test Chamber.....	256
Space Combined Effects Primary Test Research Equipment (SPECTRE)....	336
Structural Composites Concepts Facility.....	236
Structures Test Facility.....	264
Subsonic Aerodynamic Research Laboratory (SARL).....	296
Subsonic and Supersonic Combustion Research Facility.....	36
SUN GALAXY Workstation.....	320
Superconductivity and Cryogenics Laboratory.....	28
Switch Research Facility.....	158
Synthetic Scene Generation Facility (SSGF).....	164
System for Thermal Diagnostics (STDS).....	92
System Support Nondestructive Inspection Laboratory.....	370
T63 Engine Test Stand.....	96
Thermal Analysis Facility.....	94
Thermal and Vibration Laboratory (TAVLAB).....	308
Thermal Laboratory.....	22
Thermionics Laboratory.....	16
Total In-Flight Simulator (TIFS).....	272
Traction Test Rig.....	68
Transparency Systems Computer Aided Design.....	322
Transport Aircraft Cockpit (TRAC).....	304
Trisonic Gasdynamics Facility.....	292
Turbine Research Laboratory.....	100
Twenty Inch Hypersonic Wind Tunnel.....	288
Unmanned Research Vehicle (URV) Testbed Facility.....	280
Variable Stability In-Flight Simulator Test Aircraft (VISTA).....	282
Vertical Wind Tunnel.....	294
Vibration Test Facility.....	258
Vortek Radiation Heating Test Facility.....	266
X-Ray Facility.....	138

KEY WORD INDEX

KEYWORD.....	PAGE
Acoustics.....	240, 244, 250, 252, 256
Actuators.....	278
Aircraft.....	180, 270, 272, 282
Aircraft survivability.....	324
Artificial intelligence.....	168
Atomic emission.....	72, 90
Ballistics.....	110, 112, 116, 142
Battery.....	20
Bearings.....	58, 60, 62, 64, 66, 68, 74
Center of gravity.....	316
Chamber, acoustic.....	240, 244, 252, 256
Chamber, anechoic.....	222, 230, 376, 378
Chamber, blast.....	110, 132
Chamber, environmental.....	22, 56, 278, 308, 372
Chamber, flight simulation.....	194
Chamber, growth and exudation.....	134
Chamber, pressure.....	62
Chamber, inert gas.....	20, 22
Chamber, optical antenna.....	204
Chamber, vacuum.....	14, 22, 142, 356, 358
Chemical analysis.....	360
Clean room.....	14, 22
Collimator.....	194, 204, 220
Combustion.....	30, 34, 36, 38, 40, 44, 116
Communication, CNI.....	174, 176
Communication, laser.....	178
Communication, satellite.....	180
Composites.....	236, 328, 338
Compressor research.....	102, 104, 106
Computational fluid dynamics.....	114
Control systems.....	274, 276
Crew system integration.....	170, 184, 298, 300, 302
Cryogenics.....	28, 262
Data analysis.....	242
Data acquisition, mobile.....	246
Device.....	392, 394
Dry room.....	20, 22
Dynamic analyzer.....	194
Elastomers.....	332
Electrical power.....	8, 26
Electromagnetic launchers/railguns.....	150, 152, 154, 156, 158
Electronic warfare.....	212, 214, 216, 218, 230
Electro-optics.....	126, 198, 200, 204, 220, 232, 392
Engine test stand.....	96, 98
Environmental sciences.....	146
Epitaxy.....	330
Escape/ejection system.....	316, 320
Failure analysis.....	362, 364
Fatigue.....	238, 240, 244, 252, 254, 256, 264

Ferrography.....	70
Fire control.....	208
Firing tunnel.....	116
Flight control.....	268, 278
Flying qualities.....	268, 270, 272, 282
Fracture.....	238, 306
Fuels.....	42, 44, 46, 48, 50, 52, 54, 56, 262
Fuel spray.....	44
Fuel storage oven.....	48
Fuzes.....	140
Guidance systems.....	118, 122, 124, 128, 130
Gun bay.....	150
Heat transfer.....	18, 22
Helicopter rotor.....	4
High energy testing.....	154
High temperature testing.....	238, 250, 256, 260, 266, 342
Information processing, avionics.....	186
Inertial navigation.....	118
Instrumentation.....	124, 188
Integrated circuits.....	224
LAMARS.....	268
Landing gear.....	310, 312
Laser.....	10, 30, 34, 44, 140, 170, 178, 202, 356, 358
Live fire.....	324
Lubricants.....	70, 72, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 334
Materials characterization.....	344, 354
Materials compatibility/coatings.....	368
Materials measurement.....	382
Materials processing.....	340
Materials, warhead.....	144
Mechanical properties.....	348, 372
Metallography.....	344
Metallurgy.....	346
Microelectronics.....	388
Microscopy.....	86
Microwave/millimeter wave.....	390
Modal analysis.....	190
Model fabrication.....	148
Moment of inertia.....	316
Munitions.....	132, 134, 136, 138, 140, 142
Munitions handling and storage.....	134, 136
Munitions, x-ray.....	138
Neural network.....	162
Non-destructive evaluation.....	350, 352, 370
Optics.....	10, 128, 170, 206, 392
Optics, electron.....	354
Phoenix Test Rig.....	54
Photomechanics.....	248
Plasma physics.....	12
Propeller.....	6
Pulsed high voltage.....	24
Radar.....	210, 222
Radar cross section.....	376, 378, 380, 384
Radar, laser.....	202, 206, 380, 384

Rain erosion.....	366
Receivers.....	226
Scene generator.....	164
Seeker/sensor.....	128, 130
Semiconductor.....	14
Sensor.....	188, 192, 194, 196
Sensor, electro-optical.....	198, 200
Sensor, test range.....	198
Signature analysis.....	232
Simulation, CNI.....	174, 176
Simulation, engine.....	76
Simulation, flight.....	182, 194, 268
Simulation, guidance weapons.....	122
Simulation, kinetic kill hardware.....	160
Simulation, propulsion.....	2
Simulation, software.....	172
Simulator, avionics real-time.....	182
Simulator, crew station.....	298, 300, 302, 304
Simulator, electronic warfare.....	212, 214, 216, 218
Simulator, fire control.....	208
Simulator, flight control.....	268
Simulator, in-flight.....	270, 272, 282
Simulator, infrared.....	228
Simulator, motion.....	160, 268
Simulator, sensor.....	194
Simulator, space.....	336
Software, embedded.....	172
Superconductivity.....	8
Test range, atmospheric.....	110, 112
Test range, electro-optics.....	198
Test range, optics.....	128
Test stand, ejection.....	120
Thermionics.....	16
Thrust stand.....	30, 34
Tomography.....	352
Transparency.....	314, 322
Turbine engine.....	100, 102, 104, 106
Turntable.....	220, 384
Unmanned research vehicle.....	128, 280
Vibration.....	170, 190, 240, 258, 306, 308
Water table.....	318
Water tunnel.....	32, 290
Wind tunnel, hypersonic.....	286, 288
Wind tunnel, subsonic.....	292, 296
Wind tunnel, supersonic.....	284, 292
Wind tunnel, vertical.....	294